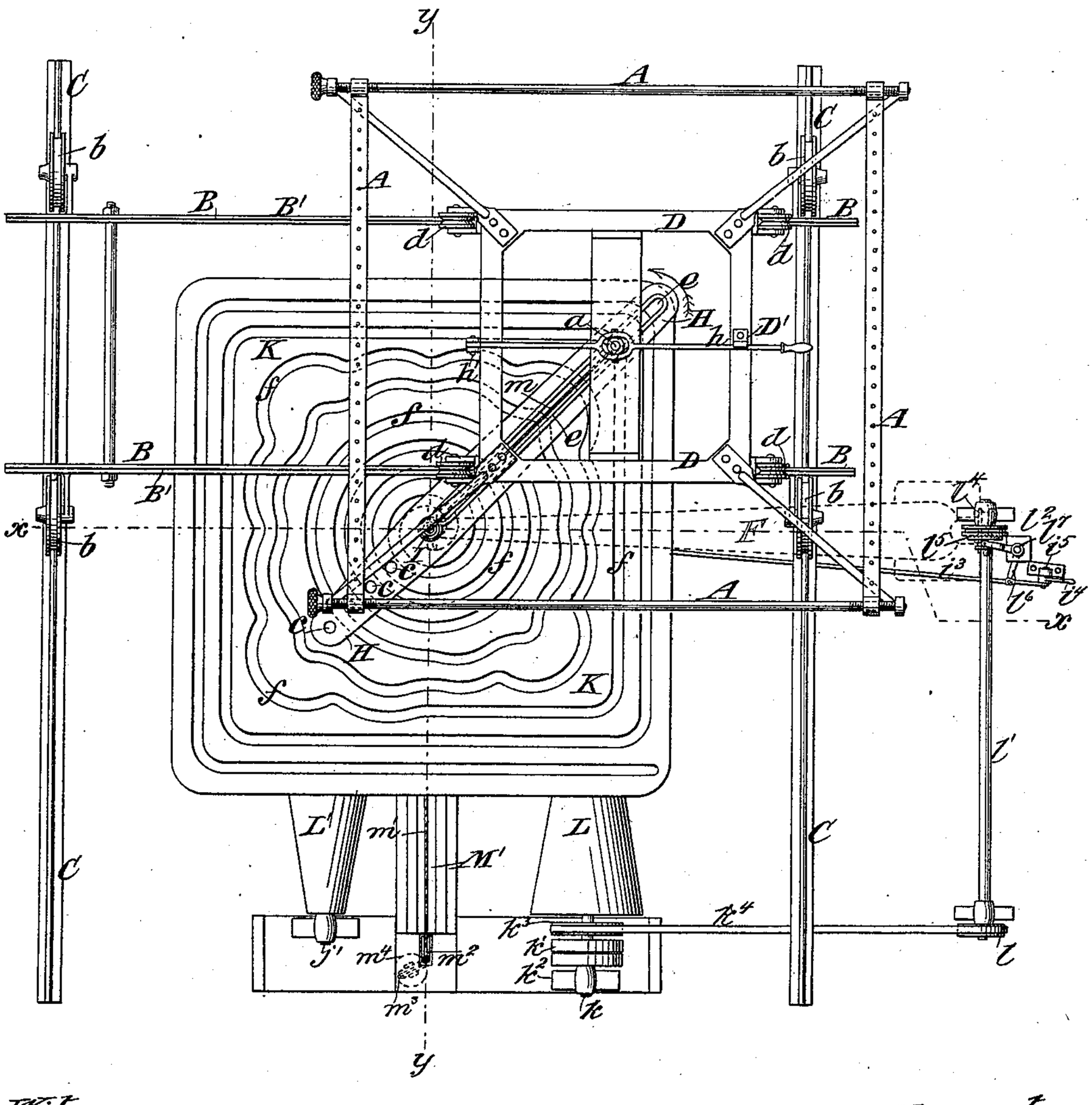
(No Model.) 3 Sheets—Sheet 1.

F. L. PALMER.

QUILTING MACHINE.

No. 541,625. Patented June 25, 1895.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

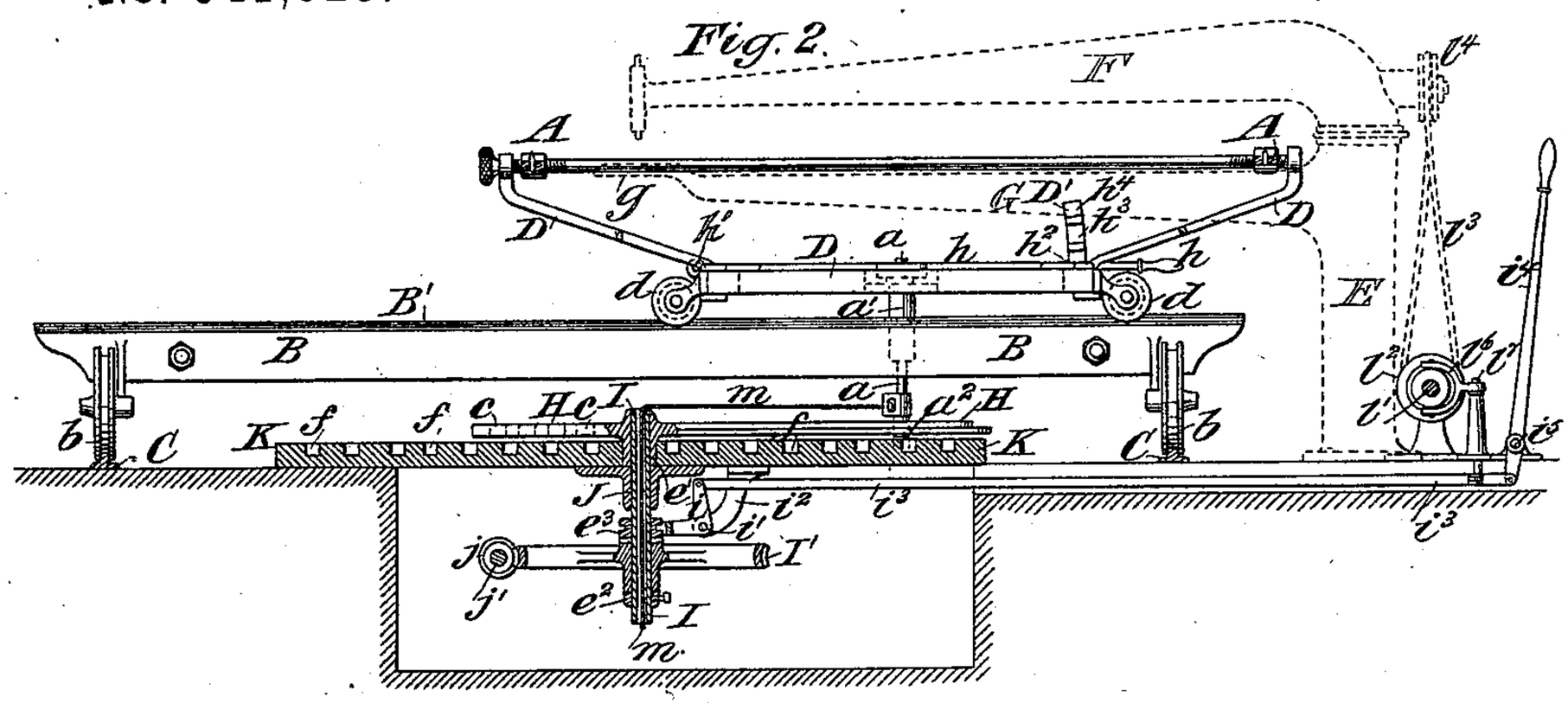


Fig. 4.

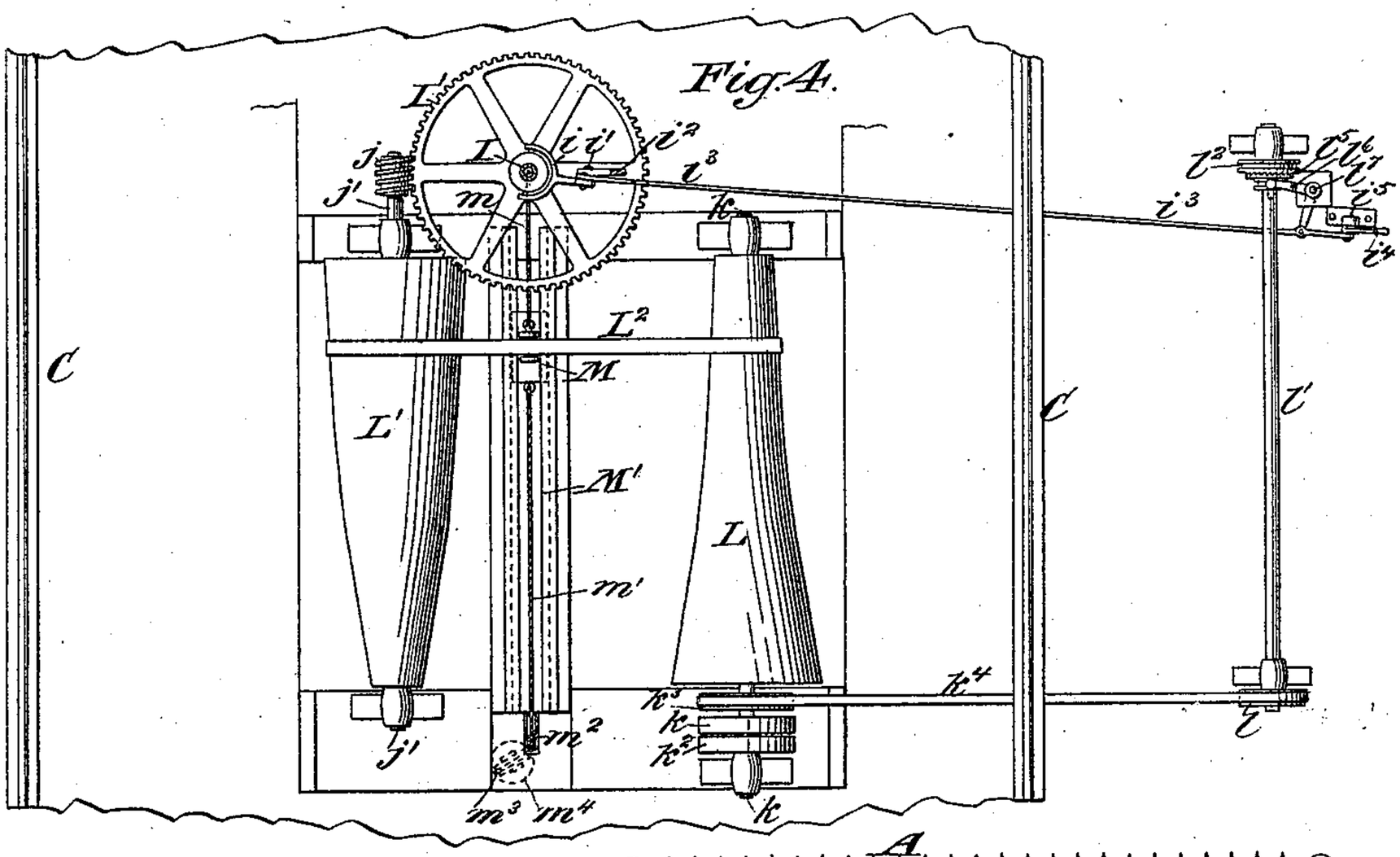
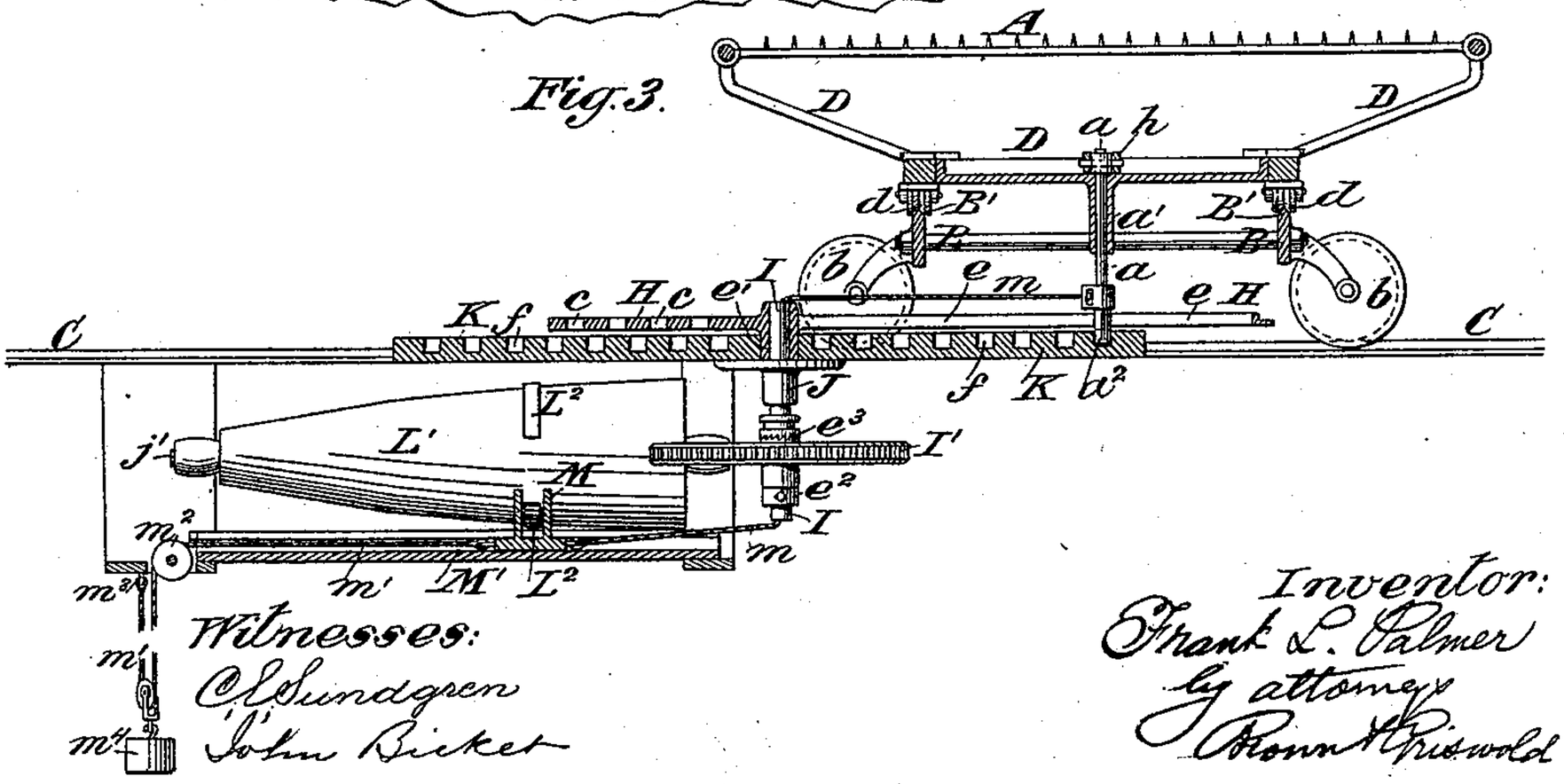


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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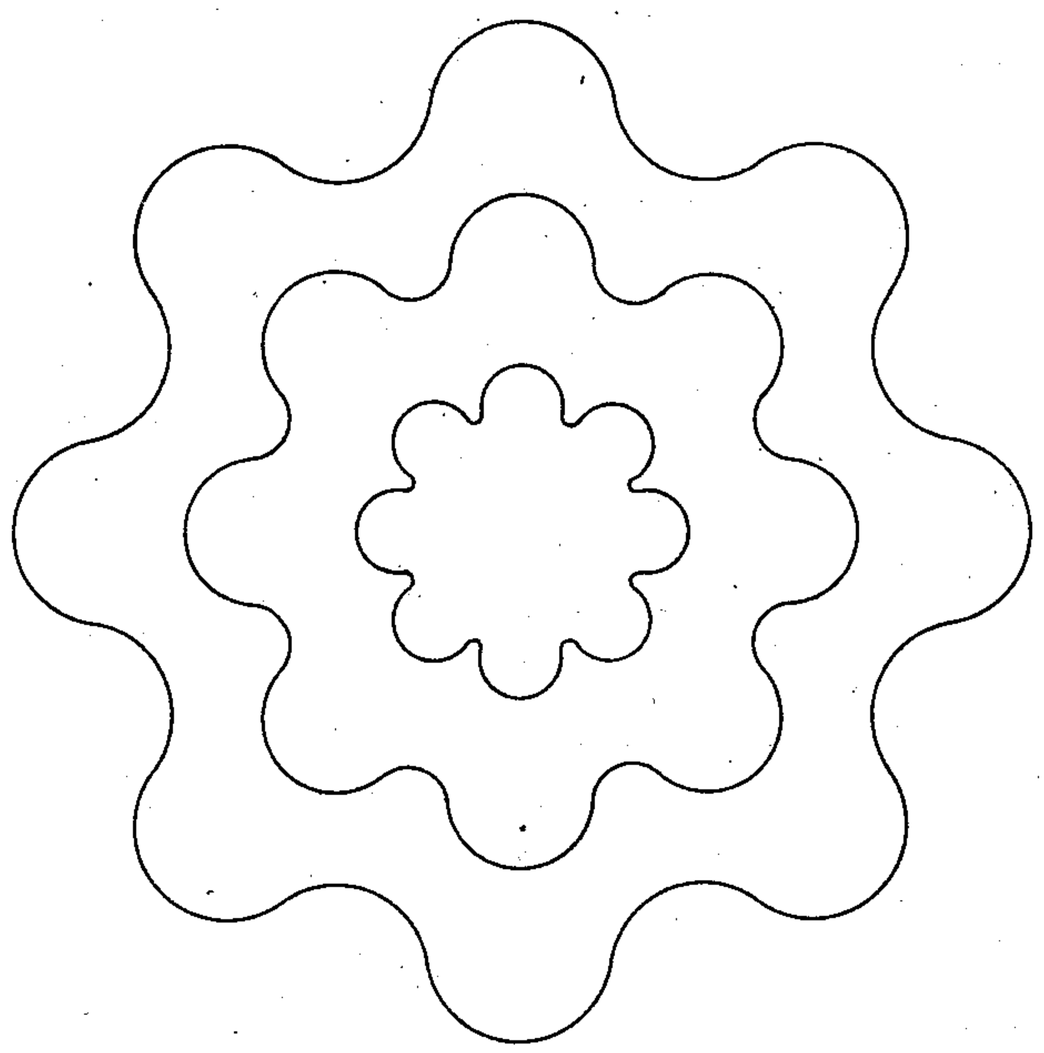
Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK L. PALMER, OF NEW LONDON, CONNECTICUT.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 541,625, dated June 25, 1895.

Application filed October 13, 1888. Serial No. 288,002. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. PALMER, of the city of New London, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Quilting-Machines, of which the following is a specification, reference being had to the accompanying drawings.

I will first describe my invention with reference to the drawings and afterward point out its novelty in claims.

Figure 1 in the drawings is a plan view of a quilting-machine embodying my invention. Fig. 2 represents a vertical section in the line *x x* of Fig. 1. Fig. 3 represents a vertical section substantially in the line *y y*, Fig. 1. Fig. 4 is a plan of variable driving mechanism which is employed in the machine. Fig. 5 is a diagram illustrating a pattern which might be produced by the machine.

Similar letters of reference designate corresponding parts in all the figures.

In carrying out my invention, the quilting machine always comprises a fabric-holder and a sewing-machine one of which has a movable support. In the example represented, it is the fabric-holder which has the movable support and the sewing machine occupies a fixed position.

The fabric holder is represented as consisting of a frame A, such as is commonly used for holding the fabric fixedly extended in a quilting machine. The movable support for said fabric holder is represented as consisting of a lower movable carriage B, mounted on wheels *b* running on fixed tracks C, C, and an upper movable carriage D, mounted on wheels *d*, which run freely on parallel tracks B′ on the lower carriage, B, the said tracks B′ being at right angles to the fixed tracks C, C.

E F G designate the sewing machine of which E is the standard. G is the arm which carries the work-plate, *g*, and F is the arm which carries the needle guide and the needle operating shaft. The arms F and G must be long enough for nearly the whole length or width of the fabric holder A, to pass between them. The machine is, or may be, in other respects like the sewing machines commonly used in quilting machines. I have therefore not thought it necessary to here fully describe it.

To distinguish the sewing machine from other parts of the quilting machine, I have represented it in Figs. 1 and 2 in dotted outline.

H designates a rotary driver which is here represented as a horizontal beam arranged below the movable support B, D, and secured to a vertical shaft I, which works in a stationary bearing J. This beam is represented as projecting from its shaft in opposite directions. The part projecting in one direction has in it several holes *c*, at different distances from the shaft and the axis of rotation of the driver, and the part projecting in the other direction has in it a long guide-way *e*, represented in Fig. 1 as consisting of a straight slot.

a, designates an engaging device for engaging the movable support of the fabric-holder with the driver H. This engaging device is represented as consisting of an upright pin or rod which is capable of sliding vertically in a socket *a′*, in the lower part of the upper carriage D, of the movable support of the fabric-frame and which is prolonged downward far enough to enter one of the holes *c*, in the rotary driver or to enter and pass through the guide-way *e*, in said driver as shown in Fig. 3.

K, designates a pattern represented as consisting of a horizontal plate arranged below the driver H, and having in it a track *f*, having smooth sides. This track is of voluted construction commencing at or near the center of the pattern plate K, and winding around the center repeatedly and continuously and being extended to near the outer margin of the said plate. The form of the several turns of this groove around the center of the pattern plate may be varied indefinitely and may be all alike or all different or some alike and some different but this similarity or difference is a matter of design. By the term "voluted construction" as applied to the track *f*, I do not intend to limit myself to any particular form or design but I use the term "voluted" to imply that the pattern winds repeatedly and continuously around the center.

The pin or rod *a*, which I have herein termed the engaging device, is provided at its lower end with a friction-roller a^2, of a size to turn within the pattern track *f*. The said pin or rod is connected with a lever *h*,

which works on a fulcrum h', on the upper carriage D, of the fabric-holder-support. By this lever the said pin or rod may be raised entirely above the rotary driver H, to disengage the said support from the said driver, or the said pin or rod may be depressed low enough to enter in any one of the holes c, of the rotary driver that may be brought beneath it and thus engage the fabric-holder-support with the said driver without engaging it with the pattern, or it may be depressed low enough to pass through the guide-way e, in the rotary driver and enter the pattern track f, so as to engage the fabric-holder-support with both the driver and the pattern. The said lever may be secured to hold the engaging device in either of the three positions above mentioned by being sprung into one of the three notches h^2, h^3, h^4 in a stand D', erected on the carriage D. It is shown in Fig. 1 as in the lowest position, in which it produces the engagement of the engaging device with both the driver and the pattern.

The shaft I of the rotary driver which is made hollow for a purpose hereinafter to be explained, is represented as passing through the center of the pattern plate K, its bearing J being secured to the bottom of the said plate and a further bearing being afforded in the said plate for the hub e' of the carrier. The said shaft is provided on its lower part with a worm gear I', which is fitted loosely to it and supported on a collar e^2, which is fast on the said shaft; and above the said worm gear is one member e^3, of a clutch, the other member of which is fast to the worm gear, the said member e^3, being fitted to the shaft with a spline to be capable of moving longitudinally thereon but to turn therewith. A forked lever i, working on a fixed fulcrum pin i', supported in a bracket i^2, under the pattern plate K, serves the purpose of engaging the worm gear I', with the shaft and disengaging it therefrom. This lever i is connected by a rod i^3, with a hand lever i^4, working on a fixed fulcrum i^5. The worm gear I' gears with an endless screw j on a horizontal shaft j' which works in fixed bearings and which carries one, L', of the pair of cone pulleys, the other of which, L, is carried by the horizontal main shaft k, of the machine. A belt L^2, runs from the cone pulley L, to that L', for the purpose of driving the endless screw, worm gear and driver H, at variable speeds.

The main shaft k, carries fast and loose pulleys k' k^2, to receive the main driving belt which drives the said shaft at a uniform speed. The said shaft also carries a pulley k^3, which receives a belt k^4, which runs to a pulley l, on a horizontal shaft t', the purpose of which is to drive the sewing machine and which for that purpose is provided with a pulley l^2 from which the belt l^3 runs to the pulley l^4 on the needle operating shaft of the sewing machine. The pulley l^2 is loose on the shaft l', but is capable of being engaged therewith and disengaged therefrom by means of a clutch l^5, operated by a forked elbow lever l^6 which works on a fixed fulcrum l^7. The said elbow lever l^6 is connected with the same hand lever i^4 hereinbefore described as operating the clutch, e^3, which engages the worm gear I' with a shaft I. This lever, i^4 operates both clutches in such a manner that both are engaged together and disengaged together so that the rotary driver and the sewing machine are both in operation at the same time and both out of operation at the same time.

M is a belt shifter applied to the belt L^2 for the purpose of shifting said belt on the cone pulleys L, L' for the purpose of varying the speed of the rotary driver. This belt shifter slides in a fixed horizontal guide way M'. It is connected by a cord m with the engaging device a, hereinbefore mentioned, the said cord passing through the hollow shaft I of the rotary driver. The said belt shifter has also attached to it one end of a cord m' which runs over the pulley m^2 and the other end of which is made fast at a suitably fixed point m^3. See Fig. 3. Between the pulley, m^2, and the point of attachment, m^3, a portion of the cord depends and forms a bight in which is suspended a weight, m^4, the action of which weight upon the cord, m', is to pull the bell shifter M in a direction to shift the belt L^2 toward the larger portion of the driving cone pulley L and toward the smaller part of the other cone pulley L' and at the same time by means of the cord m, to pull the engaging device, a, toward the center of the pattern.

When the engaging device, a, is engaged at the same time with the driver H, and the pattern track f, the operation of the machine is as follows: The engaging device at the commencement of the operation might be placed at either end of the pattern track f, and rotary motion being imparted to the carrier in one direction or the other causes the engaging device to move along the pattern track toward or from the center according to the direction of the rotation of the driver. In the machine represented, the clutch e^3 is constructed to produce the rotation of the driver in the direction of the arrow shown upon it in Fig. 1 and this with the pattern having the turns of its volute in the direction represented, requires the pattern to be commenced at the center. At the same time that rotary motion is imparted to the driver, the sewing machine is also set in operation and as the engaging device a, is made by the rotation of the driver to run along the track f of the pattern, the carriages A, and B, constituting the movable support of the fabric-holder are caused to follow the movements of the engaging device and give to the fabric a movement corresponding with the pattern thereby causing the sewing machine to produce the pattern in the fabric.

It is obvious that as the engaging device in following the evolutions of the pattern track, moves farther from the center of the driver, the amount of movement given to the fabric

holder by a given movement of the carrier about its axis will increase, and hence unless some means of compensation for this greater movement be provided, the stitch produced by the sewing machine would gradually increase in length as the engaging device moved farther from the center of the carriage. It is to afford this compensation that the variable driving mechanism consisting of the cone pulleys L, L′, the belt L^2 and the belt shifter M are provided, and that the said belt shifter is connected with the engaging device *a* by means of the cord *m*. As the engaging device follows the pattern outward from the center and is thus moved outward along the guide-way the belt-shifter actuated by the cord *m* moves the belt to a smaller portion of the driving cone pulley L and to a larger portion of the driven cone-pulley L′, and thereby produces a diminution of the velocity of the revolution of the driver. If on the other hand, the engaging device in following the pattern should move toward the center of the driver, the cord *m*, will permit the weighted cord *m′*, to pull the belt-shifter in the opposite direction to shift the belt to a larger portion of the driving cone-pulley L, and a smaller portion of the driven cone pulley L′, and thereby to cause the driver to rotate at a reduced velocity. This diminution or increase of velocity of the driver will, if the cone-pulleys are properly proportioned, be exactly in proportion to the increasing distance of the engaging device from the center of the driver, and the velocity of the needle motion of the sewing machine being constant the movement of the engaging device along the track will always be uniform for every movement of the sewing machine needle and a uniform length of stitch will be produced in all parts of the stitched figure on the fabric.

By the use of a pattern consisting of a continuous track of voluted construction, I am enabled to produce with a sewing machine having but one needle, a complete quilt without any stoppage of the quilting machine.

In case of its being desired, with a quilting machine having such a rotary driver as is herein described, to produce a pattern consisting of a series of circles, the use of the pattern may be dispensed with. The engaging device *a*, is then inserted in one of the holes *c*, *c*, in the rotary driver and the movable support is then caused to describe a circle. A figure consisting of a series of circles of different diameter may be produced by inserting the engaging device in several of the holes *c*, *c*, in succession.

The capability of the machine herein described as illustrative of my invention is not, however, limited to the use of a pattern of voluted construction nor to the production of stitching in circles, but such a machine may be employed for the production of other patterns such, for instance, as one composed of a series of figures such as are shown in Fig. 5 one surrounding another. In the production of such a pattern, the engaging device would be used in the guide-way of the driver so that it might move toward and from the axis thereof to follow the sinuosities of the figures, but it would require to be lifted from one to another of the series of endless tracks provided in the pattern plate corresponding in form with the said figures.

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

1. In a quilting machine the combination with a fabric-holder in which the fabric is fixedly held while being quilted and a sewing machine, of a support for one of said parts movable in a plane in directions transverse to each other, a rotary driver, and an engaging device connected with said movable support and engaging with said rotary driver at a distance from the axis of the latter to move around the said axis as the driver rotates, substantially as herein set forth.

2. In a quilting machine, the combination with a sewing machine and a fabric holder in which the fabric is fixedly held while being quilted, of a support for one of said parts movable in a plane in directions transverse to each other, a rotary driver, an engaging device connected with said movable support, and means for connecting said engaging device and said driver at variable distances from the center of said driver, all substantially as herein described.

3. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of said parts, a rotary driver, an engaging device connected with said movable support for engagement with said driver to rotate with the latter at variable distances from the center thereof, and means for automatically moving said engaging device along the said driver toward and from the center thereof, substantially as herein described.

4. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of said parts, a driver having a rotary motion in a plane parallel with the plane in which said support is movable, a pattern and an engaging device connected with said movable support and engaging at the same time with the said driver and pattern, substantially as herein described.

5. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of said parts, a rotary driver, a pattern, and an engaging device carried by said support and engaging with said driver at a distance from the center thereof and adjustable to engage said support with the said driver alone or with the said driver and pattern, substantially as herein described.

6. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of said parts, a rotary driver having in it a guide-way projecting from the axis thereof, a pattern, and an

engaging device connected with the said support, engaging with the pattern, and movable in said guide-way, substantially as herein described.

7. In a quilting machine, the combination with a fabric-holder and a sewing-machine, of a movable support for one of the said parts, a rotary driver having in it a guide-way projecting from the axis thereof, a pattern, an engaging device between said support and driver movable in said guide-way, variable driving mechanism for producing the rotation of said driver, and a connection substantially as herein described between said engaging device and said driving mechanism for varying the speed of the driver according to the position of said engaging device in said guide-way, substantially as herein described.

8. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of said parts, a rotary driver having a hollow central shaft, an engaging device between said support and driver, variable driving mechanism, a connection between said variable driving mechanism and said engaging device consisting of a cord passing through said hollow shaft substantially as herein described.

9. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of the said parts, a rotary driver under the said support and a pattern under the said driver, an engaging device consisting of a pin or rod fitted to said driver and movable upward and downward therein to engage with the carrier alone or with both the carrier and pattern, substantially as herein described.

10. In a quilting machine, the combination with a fabric-holder and a sewing machine, of a movable support for one of the said parts, a rotary driver having a guide-way therein projecting from its center, and an engaging device connected with said support and engaging in said guide-way, of a variable driving mechanism for said driver consisting of a driving cone pulley, a driven cone pulley geared with the driver, a belt on said cone pulleys, a belt-shifter M for said belt, a cord *m*, connecting said belt-shifter with said engaging device to move the said belt-shifter in one direction, and a weighted cord *m'* attached to said belt-shifter for moving it in the opposite direction, substantially as herein described.

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