

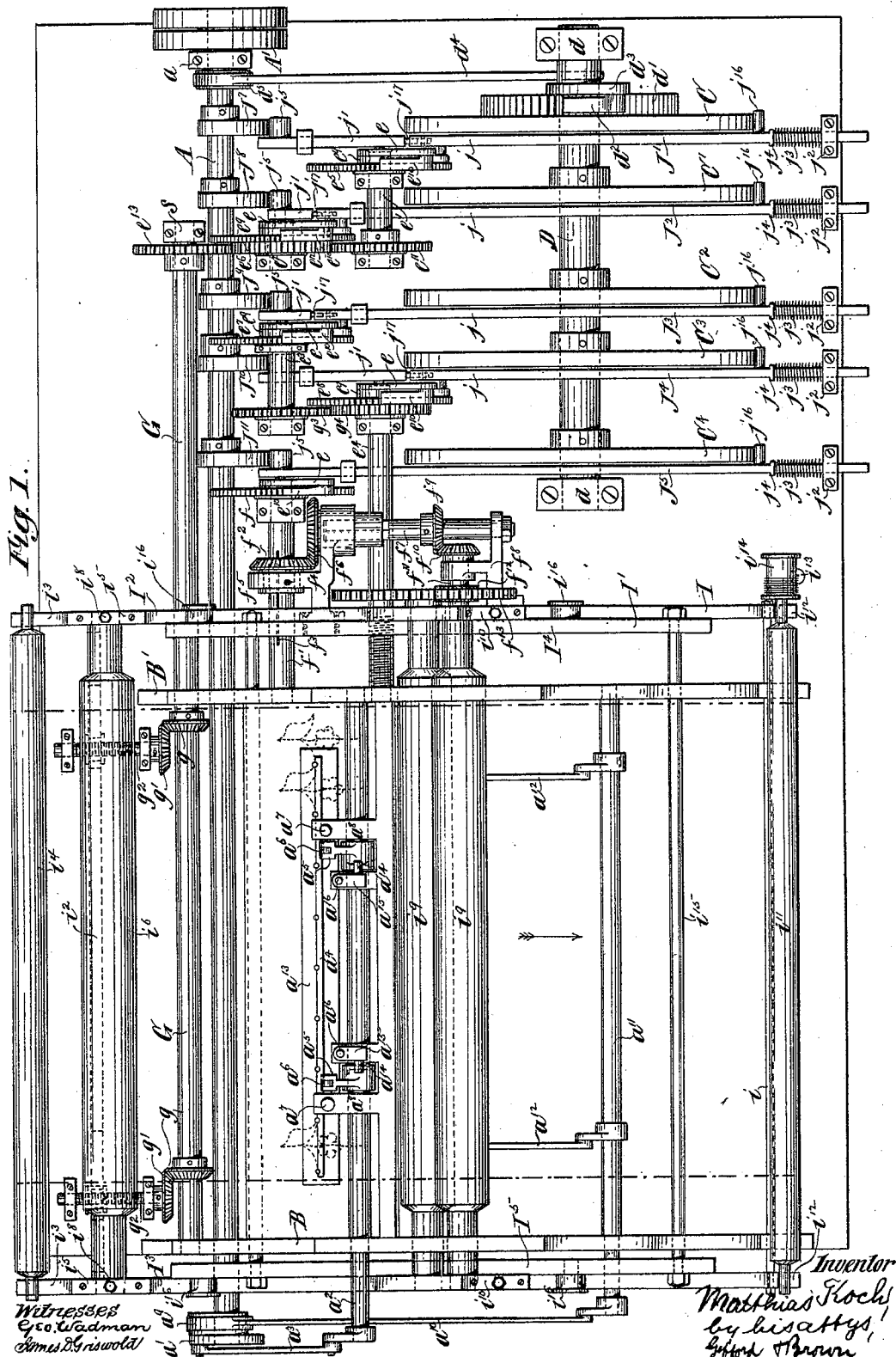
(No Model.)

7 Sheets—Sheet 1.

M. KOCH.  
QUILTING MACHINE.

No. 421,584.

Patented Feb. 18, 1890.



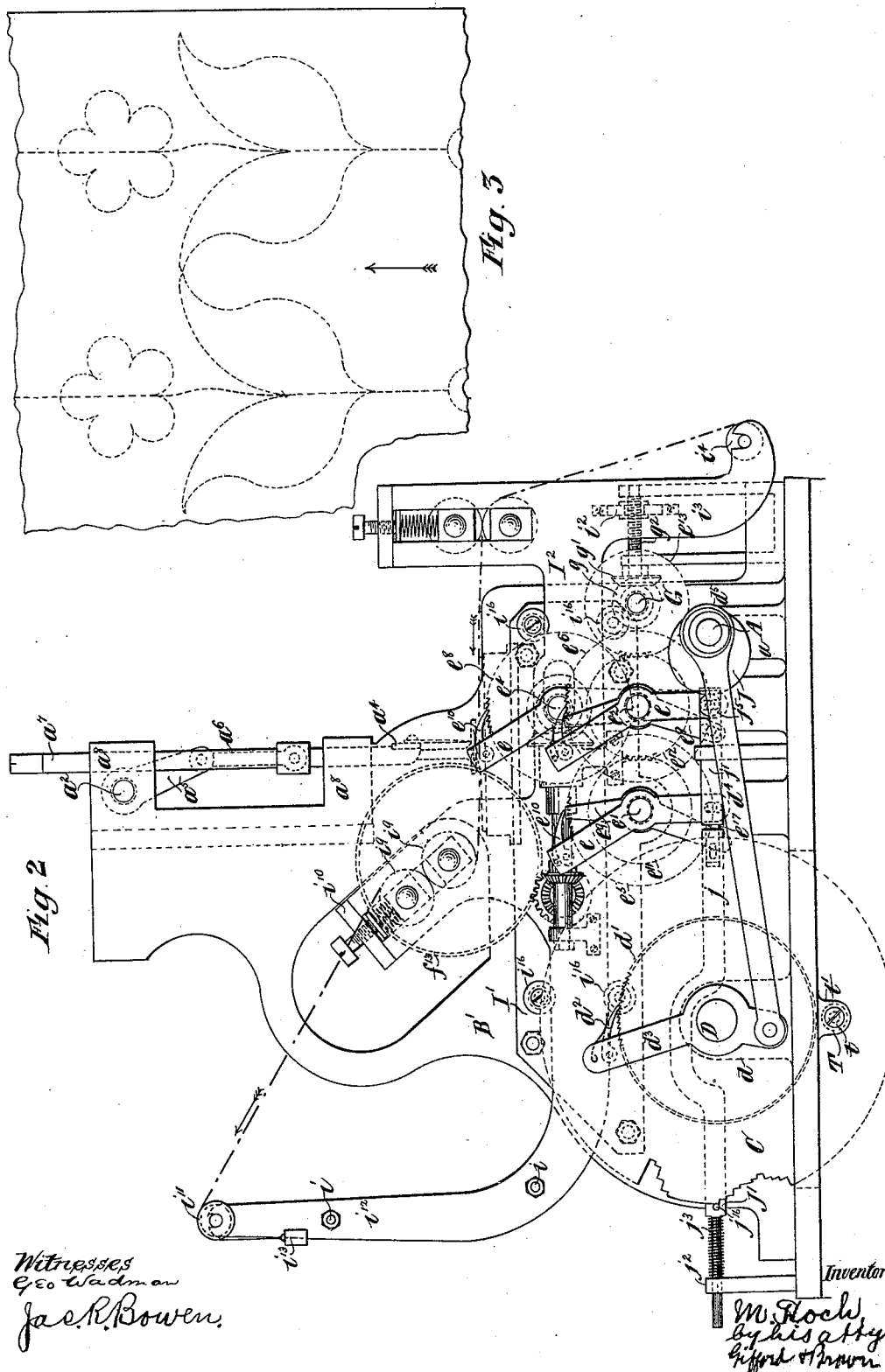
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7 Sheets—Sheet 2

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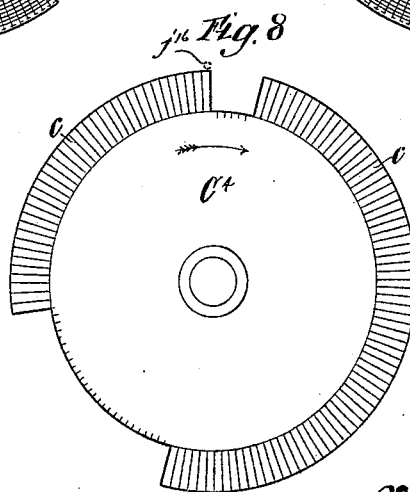
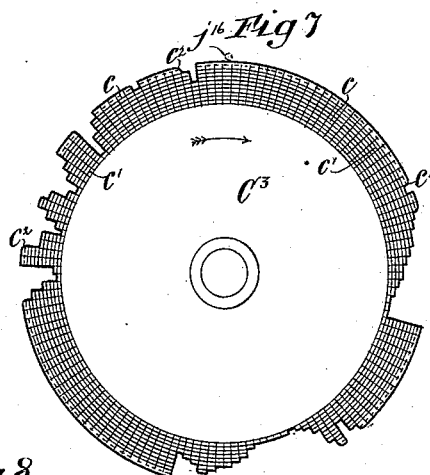
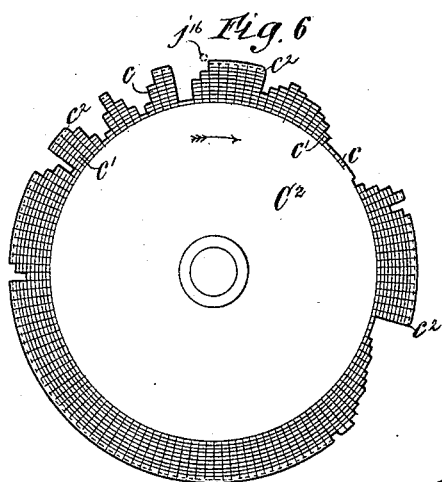
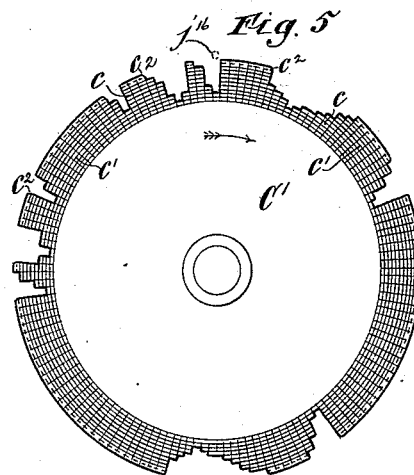
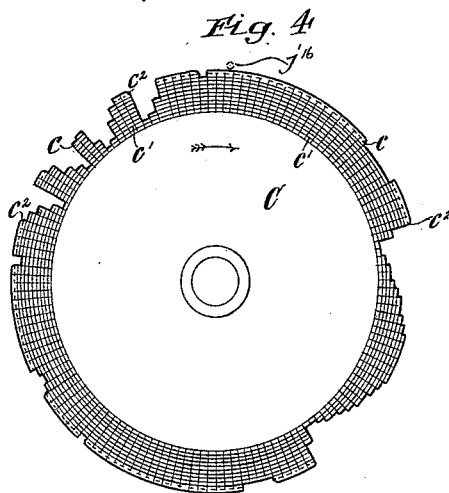
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7 Sheets—Sheet 3.

M. KOCH.  
QUILTING MACHINE.

No. 421,584.

Patented Feb. 18, 1890.



*Witnesses*  
*Geo. Wadman*  
*Jack Bowen*

*Inventor*  
*Matthias Koch*  
*by his attorneys*  
*Gifford & Brown*

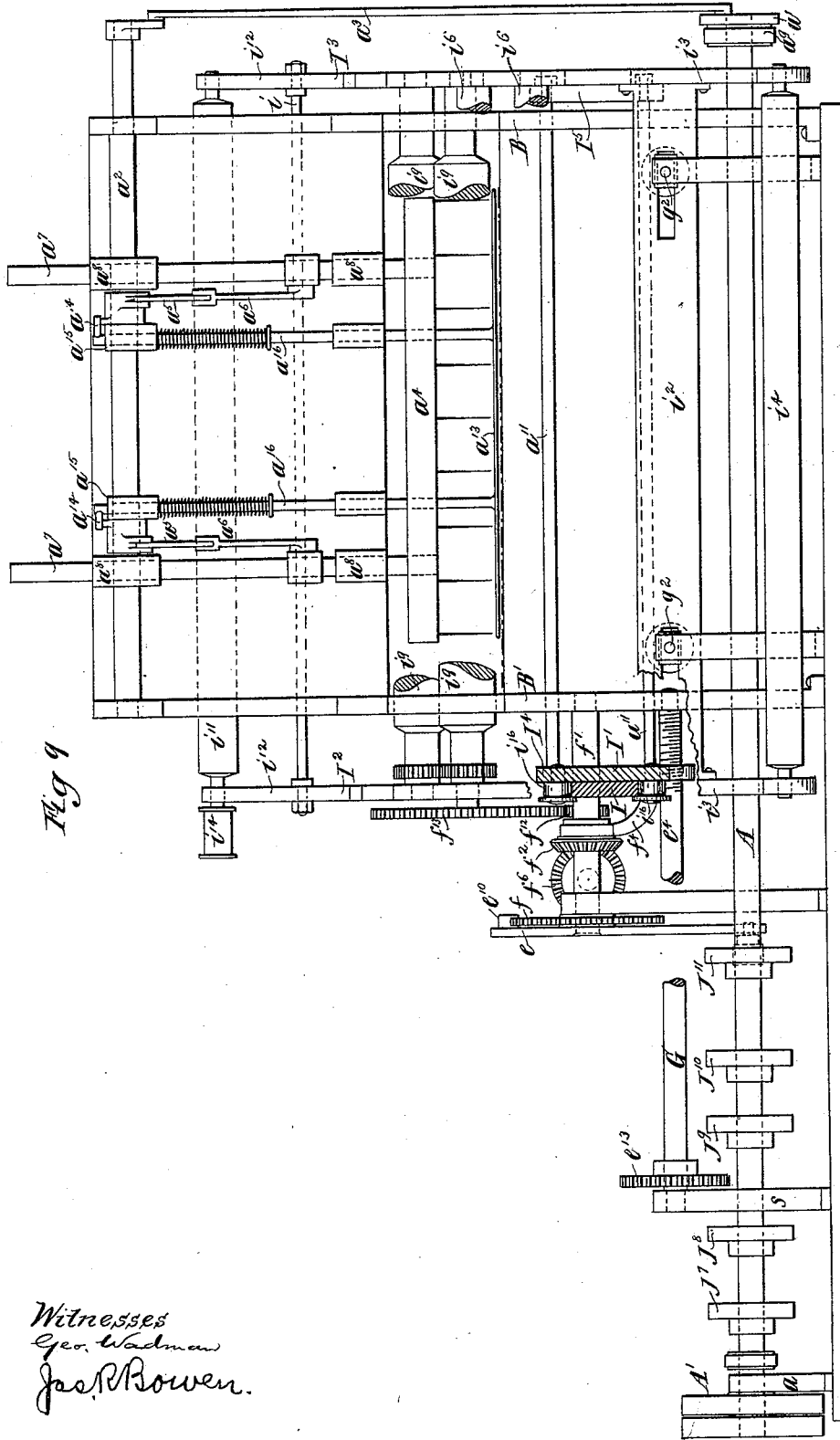
(No Model.)

7 Sheets—Sheet 4.

M. KOCH.  
QUILTING MACHINE.

No. 421,584.

Patented Feb. 18, 1890.



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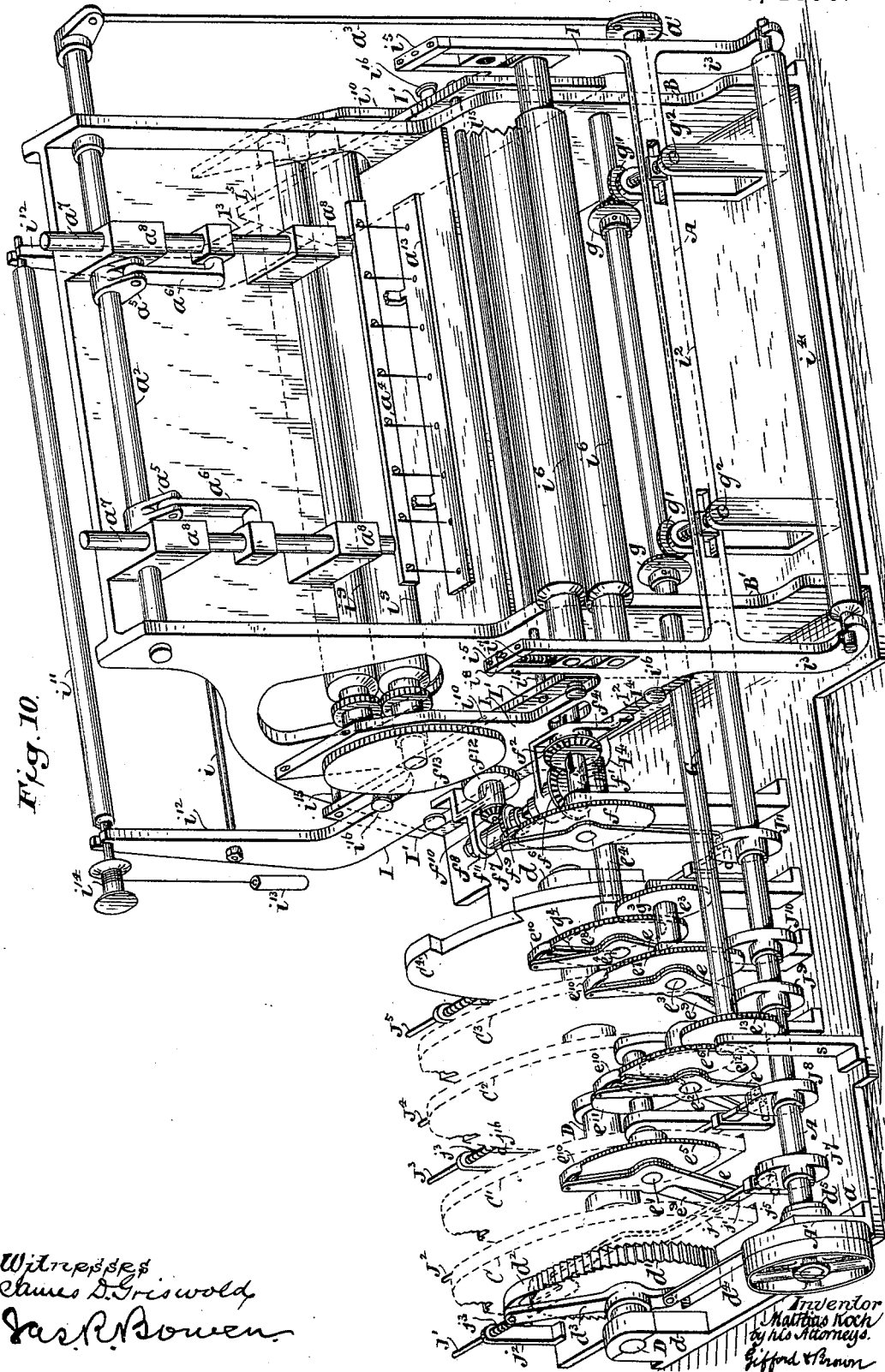
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7 Sheets—Sheet 5.

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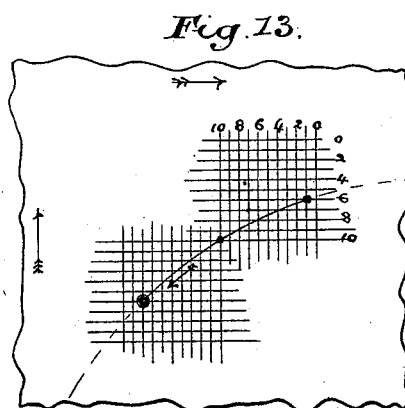
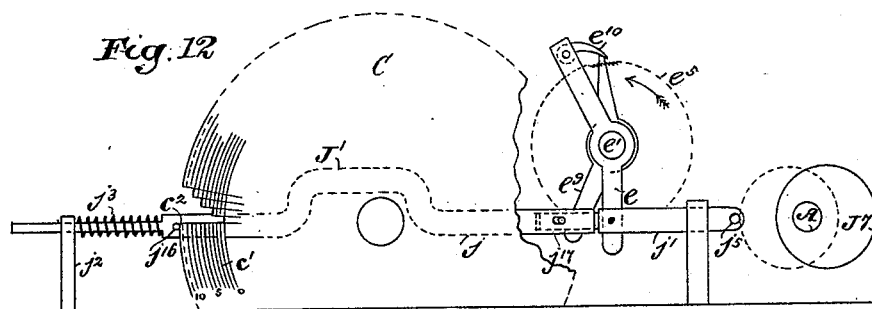
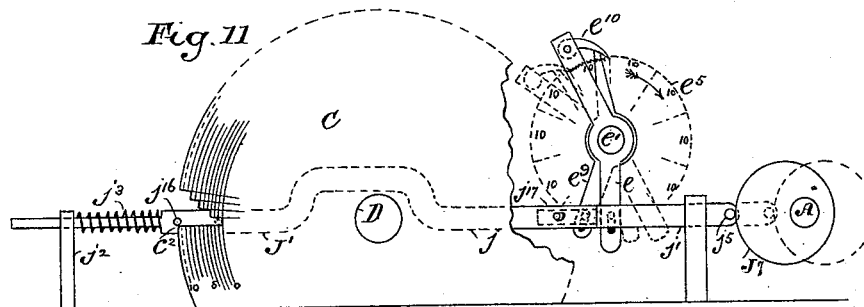
(No. Model.)

7 Sheets—Sheet 6.

M. KOCH.  
QUILTING MACHINE.

No. 421,584.

Patented Feb. 18, 1890.



Witnesses  
James D. Griswold  
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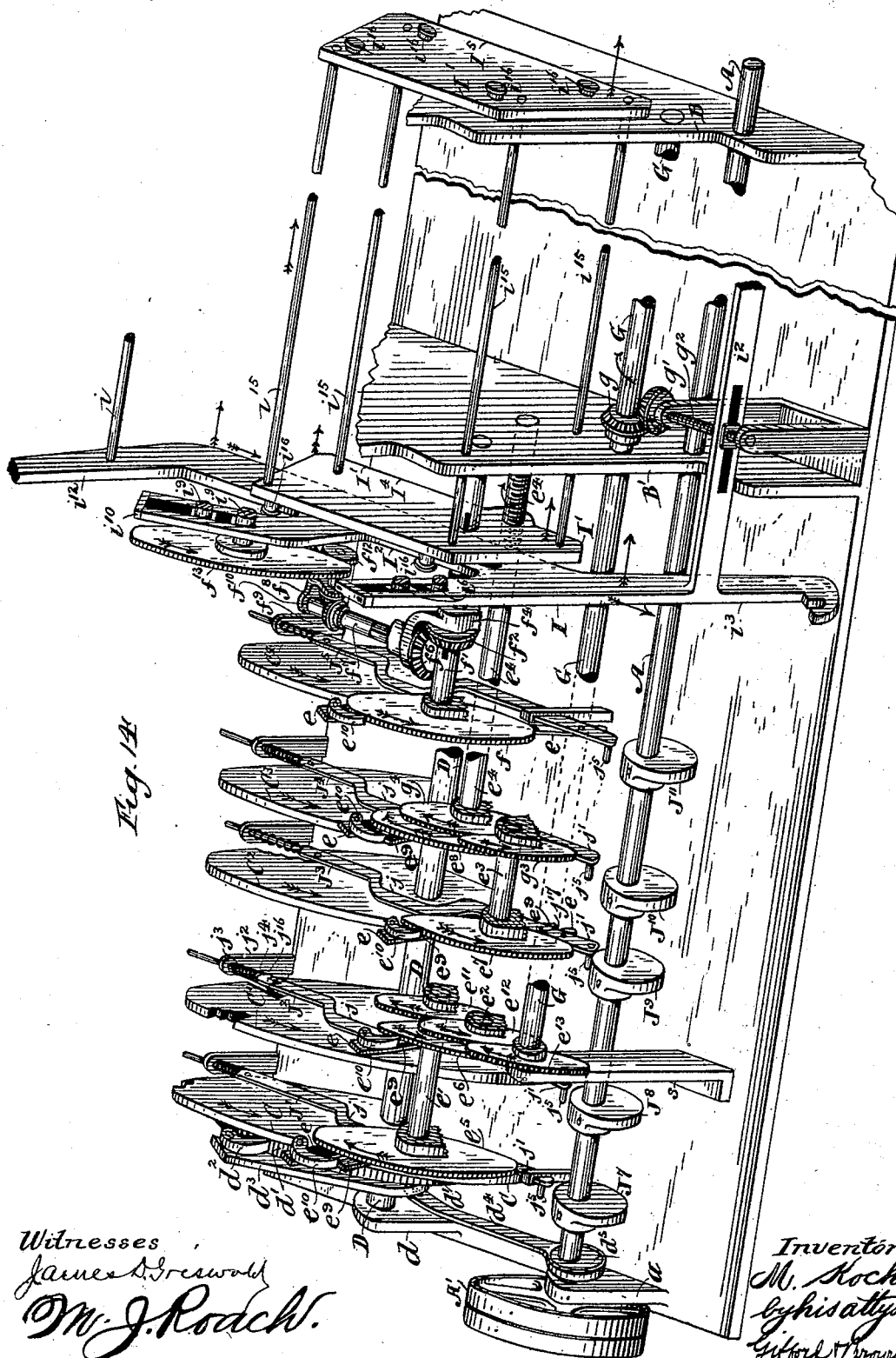
(No Model.)

7 Sheets—Sheet 7.

M. KOCH.  
QUILTING MACHINE.

No. 421,584.

Patented Feb. 18, 1890.



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# UNITED STATES PATENT OFFICE.

MATTHIAS KOCH, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO LOUIS SCHULTZ, OF SAME PLACE.

## QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 421,584, dated February 18, 1890.

Application filed April 19, 1886. Serial No. 199,412. (No model.)

*To all whom it may concern:*

Be it known that I, MATTHIAS KOCH, of New York, in the county and State of New York, have invented a certain new and useful Improvement in Sewing-Machines, of which the following is a specification.

My improved sewing-machine is designed to sew patterns of various designs upon fabric. I employ a gang of needles which work in unison and all sew similar patterns. The goods to be sewed are borne upon a carriage which has a four-way motion, or a motion fore and aft and from side to side of the machine. The goods have also an independent forward feed.

I will describe the machine in detail and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a plan or top view of a quilting-machine embodying my improvement. Fig. 2 is an end view thereof. Fig. 3 represents a pattern which may be sewed on the machine. Figs. 4, 5, 6, 7, and 8 are face views of certain pattern-wheels used in the machine. Fig. 9 is a front elevation showing more clearly certain carriages, portions of the machine being omitted. Fig. 10 is a perspective view, on an enlarged scale, illustrating my improvement. Figs. 11 and 12 illustrate in detail certain features of the machine, the parts being shown in different positions in the two figures. Fig. 13 is a diagrammatic view showing one course of the stitches. Fig. 14 is a perspective view, on an enlarged scale, looking toward the left of Fig. 10.

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

A designates the main shaft, to which motion may be imparted by a belt on a pulley A'. This shaft is journaled in suitable bearings in a pillar a, extending upwardly from the bed of the machine, and also in side portions B B' of the frame of the machine. A crank a' is mounted upon the end of the main shaft beyond the portion B of the frame. This crank imparts motion to a rock-shaft a<sup>2</sup> through an intermediate crank-rod a<sup>3</sup>. The rock-shaft a<sup>2</sup> is journaled in suitable bearings in the portions B B' of the frame and imparts motion to a needle-bar a<sup>4</sup>, in which a gang of needles is secured. Motion is trans-

mitted from the rock-shaft to the needle-bar by arms a<sup>5</sup>, rigidly keyed to the rock-shaft and pivotally connected to links a<sup>6</sup>, which are in turn pivotally connected to vertical sliding rods a<sup>7</sup>, working in suitable guides a<sup>8</sup> in the frame. The needle-bar is rigidly secured to the rods a<sup>7</sup>. Upon the main shaft adjacent to the crank a' is an eccentric a<sup>9</sup>, operating through an eccentric-rod a<sup>10</sup>, rock-shaft a<sup>11</sup>, and rods a<sup>12</sup> to impart motion to shuttle-drivers, which, together with the shuttles and shuttle-races, may be of the usual or any desired construction. I have shown a presser-bar a<sup>13</sup>, operated by toes a<sup>14</sup> on the rock-shaft, coming in contact with projections a<sup>15</sup> on the upper ends of rods a<sup>16</sup>, to which the presser-bar is secured, as usual.

As the features so far described do not constitute part of my invention, I have referred to them thus briefly.

C C' C<sup>2</sup> C<sup>3</sup> designate, respectively, pattern-wheels by which the movements of the carriages upon which the goods are borne are regulated. C<sup>4</sup> designates a pattern-wheel for regulating the forward feed to the goods when said carriages are at rest. As shown, the wheels C C' govern the forward-and-back movement of the goods and the wheels C<sup>2</sup> C<sup>3</sup> govern the side-to-side movement of the goods; but it is to be understood that they may be arranged in any desired order. All five of these pattern-wheels are rigidly keyed to a horizontal shaft D, journaled in suitable bearings in posts d, extending upwardly from the base of the machine. An intermittent rotary motion is imparted to this shaft, and consequently to the pattern-wheels, by means of a ratchet-wheel d', keyed to the shaft D outside the pattern-wheel C, which ratchet-wheel is actuated by a pawl d<sup>2</sup>, mounted on a rocking arm d<sup>3</sup>. A crank-rod d<sup>4</sup>, pivotally connected to the arm d<sup>3</sup> and receiving motion from an eccentric d<sup>5</sup> on the main shaft, actuates said arm. Each rotation of the main shaft causes the pawl d<sup>2</sup> to move the ratchet-wheel a distance equivalent to the length of one of its teeth. This motion is so timed as to occur when the needles are raised out of the goods, or, in other words, no motion of the carriages occurs when the needles are operating on the goods.



I I' designate carriages for the goods to be sewed. The carriage I supports the goods and has a movement fore and aft the machine imparted to it. The carriage I' supports the carriage I and has a motion from side to side of the machine imparted to it. By moving these carriages in a manner hereinafter to be described a movement universally forward and back and from side to side in one plane may be imparted to the goods beneath the needles.

The carriage I consists of two side pieces I<sup>2</sup> I<sup>3</sup>, secured together by tie-rod *i* and a transverse casting *i*<sup>2</sup>. In downwardly-extending portions *i*<sup>3</sup> at the front of the machine is hung a delivery-roller *i*<sup>4</sup> for the goods. Journaled in suitable housings in upwardly-extending portions *i*<sup>5</sup>, also at the front of the machine, are presser-rollers *i*<sup>6</sup>, the upper of which is pressed down upon the other with a yielding pressure by means of springs *i*<sup>7</sup>. The resistance of the springs *i*<sup>7</sup> may be varied by screws *i*<sup>8</sup>, as shown. To the rear of the needles feed-rollers *i*<sup>9</sup> (shown as geared together) are journaled in suitable housings in other upwardly-extending portions *i*<sup>10</sup> of the carriage. The pressure of these rollers may be regulated similarly to the rollers *i*<sup>6</sup>. The goods pass from the delivery-roller between the presser-rollers, beneath the needles, between the feed-rollers, and upwardly onto a take-up roller *i*<sup>11</sup>, onto which they are wound. The take-up roller *i*<sup>11</sup> is journaled in bearings in upwardly-extending arms *i*<sup>12</sup>, forming part of the carriage I, at the rear of the machine. Motion is imparted to this roller, as shown, by a cord and weight *i*<sup>13</sup>, the cord being wound upon a spool *i*<sup>14</sup> upon the end of the roller-journal.

The carriage I' consists of two side portions I<sup>4</sup> I<sup>5</sup>, secured together by rods *i*<sup>15</sup>, which rods extend loosely through slideways in the portions B B' of the frame. The portions I<sup>4</sup> I<sup>5</sup> of this carriage are between the portions I<sup>2</sup> I<sup>3</sup> of the carriage I and the portions B B' of the frame, and are provided upon their outer surfaces with anti-friction rollers or bowls *i*<sup>16</sup>, some of which are arranged near the top of said portions I<sup>4</sup> I<sup>5</sup> and others near the bottom thereof. The carriage I is supported by and may be moved along upon these rollers or bowls. It will be readily seen that when the carriage I is moved backward and forward no motion is imparted to the carriage I'. On the contrary, when the carriage I' is moved from side to side it carries with it the carriage I, because of the flanges on the rollers or bowls *i*<sup>16</sup>. By means of these two carriages the goods are caused to be moved either forward and back or from side to side, as desired. They also have a direct forward feed independent of the motion of the carriages, which will be described later.

I will now describe the means for imparting motion to the carriages.

The pattern-wheel C regulates the motion of the carriage I toward the rear and the pattern-wheel C' the motion of said carriage

toward the front. The pattern-wheel C<sup>2</sup> regulates the motion of the carriage I' to the left and the wheel C<sup>3</sup> the motion of said carriage to the right of Fig. 1. One of the wheels C C' may operate in conjunction with either of the wheels C<sup>2</sup> C<sup>3</sup>, or one of the wheels C<sup>2</sup> C<sup>3</sup> may operate in conjunction with either of the wheels C C', whereby a universal movement of the goods beneath the needles may be produced.

T designates a friction-brake mounted on a screw *t* and consisting of a pad of rubber or other suitable material. The screw is mounted in a bracket *t*' and may be adjusted to vary the pressure of the brake upon the pattern-wheel C.

It will be borne in mind that the pattern-wheels are intermittently rotating in unison and in the same direction. They transmit motion to the carriages as follows:

J' J<sup>2</sup> J<sup>3</sup> J<sup>4</sup> are bars extending fore and aft the machine close to the pattern-wheels. Each of the bars J' J<sup>2</sup> J<sup>3</sup> J<sup>4</sup> is composed of two sections *j j'*. The longer of these sections or *j* extend near their rear ends through guides *j*<sup>2</sup> on a portion of the frame of the machine. Springs *j*<sup>3</sup>, surrounding the rods between said guides, and shoulders *j*<sup>4</sup> on the rods tend to force the rods toward the front of the machine. The sections *j'* bear near their front ends rollers or bowls *j*<sup>5</sup>, which may be acted upon by cams J<sup>7</sup> J<sup>8</sup> J<sup>9</sup> J<sup>10</sup>, mounted on the main shaft, to force the rods toward the rear. Pivotaly connected near one of their ends to the sections *j'* of the rods are arms *e*, which arms are loosely hung upon shafts *e'* *e*<sup>2</sup> *e*<sup>3</sup> *e*<sup>4</sup>, journaled in suitable bearings in posts extending upwardly from the base of the machine. These arms bear pawls *e*<sup>10</sup> near their free ends, which are adapted to engage the teeth on ratchet-wheels *e*<sup>5</sup> *e*<sup>6</sup> *e*<sup>7</sup> *e*<sup>8</sup>, keyed to the shafts *e'*, &c. Pivotaly connected near one of their ends to the sections *j* of the rods are other arms *e*<sup>9</sup>. These arms are likewise hung on the shafts *e'*, &c. The upper ends of these arms *e*<sup>9</sup> extend beneath the pawls *e*<sup>10</sup>. When these arms *e*<sup>9</sup> are moved far enough in one direction, they will lift the pawls out of engagement with the teeth on the ratchet-wheels. When the ratchet-wheel *e*<sup>5</sup> is rotated, it transmits motion through the shaft *e'* to a gear-wheel *e*<sup>11</sup>, mounted on said shaft. The gear-wheel *e*<sup>11</sup> meshes with a gear-wheel *e*<sup>12</sup>, mounted on the shaft *e*<sup>2</sup>, which gear-wheel meshes with another gear-wheel *e*<sup>13</sup>, mounted on a shaft G, extending from side to side along the front of the machine. This shaft is journaled in the side portions B B' of the frame, and also in bearings in a post *s*, extending upwardly from the base of the machine. Between the portions B B' of the frame bevel gear-wheels *g* are mounted on the shaft G. These bevel gear-wheels mesh with bevel gear-wheels *g'*, mounted upon short screw-shafts *g*<sup>2</sup>, extending at right angles to the shaft G. These screw-shafts ex-

tend through screw-nuts secured in longitudinal slots in the casting  $i^2$ , extending between the side portions  $I^2 I^3$  of the carriage I. When, therefore, the ratchet-wheel  $e^5$  is rotated, the screw-shafts  $g^2$  cause the carriage I to move toward the rear of the machine. When the ratchet-wheel  $e^6$  is rotated by its pawl  $e^{10}$ , the pawl  $e^{10}$ , which previously engaged the ratchet-wheel  $e^5$ , has been moved out of engagement with the wheel  $e^5$  by the arm  $e^9$ , and such wheel may then rotate freely in a reverse direction, a reverse rotation being imparted to it by the gear-wheel  $e^{12}$  through the gear-wheel  $e^{11}$ . It will be readily seen that the ratchet-wheel  $e^6$  will cause the screw-shafts  $g^2$  to rotate in a reverse direction and cause the carriage I to move toward the front of the machine, because the rotation of the gear-wheel  $e^{12}$  is, when rotated by the ratchet-wheel  $e^6$ , in a reverse direction to that which it received when rotated through the medium of the gear-wheel  $e^{11}$  and ratchet-wheel  $e^5$ . The ratchet-wheel  $e^7$  is rotated by means similar to the ratchet-wheels  $e^5 e^6$ , and transmits motion to a gear-wheel  $g^3$ , mounted on the shaft  $e^3$ , which gear-wheel meshes with a gear-wheel  $g^4$  on the shaft  $e^4$ , which shaft is journaled near one end in the portion  $B'$  of the frame. Adjacent to the portion  $B'$  of the frame the shaft  $e^4$  is screw-threaded and engages a tapped hole in the side portion  $I^4$  of the carriage  $I'$ . The rotation of the ratchet-wheel  $e^7$  causes the screw-shaft  $e^4$  to rotate in a direction to move the carriage  $I'$  toward the left of Fig. 1. The ratchet-wheel  $e^8$  is actuated similarly to those described, and, being mounted directly on the shaft  $e^4$ , it necessarily causes the said shaft to rotate in a reverse direction to that which it received when rotated through the medium of the ratchet-wheel  $e^7$  and gear-wheels  $g^3 g^4$ , whereby the carriage  $I'$  will be caused to move to the right.

It is necessary, in order to sew a pattern such as I have illustrated, that the motions of the carriages should be variable, or, in other words, should be capable of moving different distances in a given direction. In sewing the clover-leaf figure shown, for instance, the carriages will move a portion of the time directly toward the right or left. At other times the carriage I will move directly toward the front or rear, and at other times the movement will be a combined side-to-side and forward or back one. When this combined movement transpires, it will be apparent that the deviation from a line running parallel with or at right angles to the direction of forward feed of the goods will be very slight in some instances. In order to provide for these slight deviations and produce a symmetrical figure, I have, for convenience, divided each stitch into ten arbitrary equal parts, so that the slightest deviation from a right line which a stitch may take will equal one-tenth the length of a stitch taken at right angles to the line from which the first stitch

deviates. Such deviations from a right line may equal any number of tenths of the length of a stitch which may be desired, according as the curve or angle of the pattern be slight or great.

The deviations of the stitches from a right line are produced as follows: Each figure of the pattern which I have illustrated in Fig. 3 contains one hundred and forty-three stitches. Each of the pattern-wheels  $C C' C^2 C^3$  is divided radially into one hundred and forty-three sections  $c$ , corresponding to the number of stitches in the pattern. Consequently when the pattern-wheels have made one complete revolution each of the needles has sewed a complete figure. Each separate movement of the pattern-wheels occasioned by the ratchet and pawl moves each of the wheels a distance equal to the length of one of the sections  $c$  on the periphery of the wheel. Each of the said pattern-wheels is also divided into eleven sections  $c'$ , which are formed by concentric circles whose centers are identical with those of the pattern-wheels. The combined width of the ten inner of these sections represents the length of a single stitch taken in the goods on a right line, and each one of the sections represents one-tenth of the length of a stitch. The periphery of each of the wheels is indented at intervals, the depth of each indentation corresponding to the number of tenths of the length of a stitch which it is desired that the stitch shall deviate from a right line—as, for instance, if the indentation equals the width of one of the sections  $c'$ , the stitch will deviate one-tenth the length of a stitch from a right line. If the indentation be equal to the width of five of the sections  $c'$ , the deviation of a stitch from a right line will equal five-tenths the length of a stitch, and so on. In the diagrammatic Fig. 13 I have have illustrated this operation more clearly.

Upon the sections  $j$  of the rods  $J'$ , &c., are pins or studs  $j^{16}$ . These pins bear constantly upon the pattern-wheels, against which they are forced by the springs  $j^3$ . As the pattern-wheels rotate the pins  $j^{16}$  drop into the notches in the pattern-wheels. It will be perceived that as a pin  $j^{16}$  drops into a notch the bar  $J'$ , &c., of which the pin forms part, is shot forward by the spring  $j^3$ , causing the arm  $e$  to rock and the pawl  $e^{10}$ , which is actuated by the cam  $J'$ , &c., to actuate the ratchet-wheel  $e^5$ , &c., with which it acts in conjunction. In the example of my invention shown each of the ratchet-wheels  $e^5$ , &c., has one hundred teeth, and each complete rotation of the ratchet-wheel will cause a movement of the goods in a rectilinear plane a distance equal to the length of ten stitches. Therefore each ten teeth on the ratchet-wheel represents a movement of the goods equal to the length of one stitch. Therefore, if the pin  $j^{16}$  drops into a notch in the pattern-wheel whose depth equals the combined width of ten of the sections  $c'$  on the pattern-wheel,

the ratchet-wheel will be moved a distance equal to ten teeth, and in like proportion for each notch into which the pin drops according to its depth. The cams  $J^7$ , &c., operate to throw the bars  $J'$ , &c., backward at each rotation of the main shaft sufficiently far to cause the pin  $j^{16}$  to move out of the notch into which it has just previously been sprung as far as the tenth circumferential section  $c'$ . (Indicated by dotted outline in Figs. 4, 5, 6, and 7.)

It is obvious that only one of the wheels  $C$   $C'$  and only one of the wheels  $C^2$   $C^3$  can be operating to move the carriages at a time. A change from  $C$  to  $C'$  or  $C^2$  to  $C^3$ , and a consequent reversal of the movement of either of the carriages, as the case may be, is produced by lifting the pawl  $e^{10}$  which has been actuating a given ratchet-wheel out of engagement with said wheel, as previously explained. This is effected by causing the pin  $j^{16}$  of its corresponding bar  $J'$ , &c., to ride up from the tenth circumferential section onto the periphery of the pattern-wheel  $C$ , &c., with which it acts, by means of the rotation of said pattern-wheel itself, which is cam-shaped, as at  $c^2$ , to admit of this, whereby the portion  $j$  of the bar  $J'$  is moved so far to the rear of the machine that the arm  $e^9$  comes in contact with the pawl and moves it out of the teeth. I have shown sliding joints  $j^{17}$  in the bars  $J'$ , &c., whereby, when this movement occurs, the portions  $j'$  will be moved without imparting movement to the portions  $j$ , and consequently to the arms  $e^9$ . I have shown the operation of these features of my improvement more clearly in Figs. 11 and 12.

When it is desired to feed the goods directly forward, the motion of the carriages is stopped in the manner described. The pattern-wheel  $C^4$  is then brought into operation, by which the feed-rollers are caused to feed the goods forward. The needles then sew a straight line of stitching in the direction of the length of the goods. Such straight lines may be sewed as part of the figures or between different figures, as the pattern being sewed may require. The wheel  $C^4$  operates through a bar  $J^5$  similar to the bars  $J'$ , &c., to transmit motion to a ratchet-wheel  $f$ , mounted on a shaft  $f'$ , journaled in bearings in a post extending up from the base of the machine, and also in the portion  $B'$  of the frame. Loosely mounted upon the shaft  $f'$  is a bevel gear-wheel  $f^2$ . This gear-wheel is provided with a rib extending into a longitudinal groove  $f^3$  in the shaft  $f'$  in such manner that the gear-wheel may slide to and fro on the shaft, but will at the same time be rotated therewith. The hub of the gear-wheel  $f^2$  extends through an opening in one arm of a frame  $f^1$ , which is rigidly affixed to the carriage  $I'$ . A collar  $f^5$  on the hub retains the gear-wheel in position. This gear-wheel meshes with another bevel gear-wheel  $f^6$ , similarly secured in another arm of the frame  $f^1$ , extending at approximate right angles to the

arm first named. The hub of the gear-wheel  $f^6$  is extended somewhat and provided with a rectangular socket, into which extends loosely the squared end of a shaft  $f^7$ , journaled near its other end in one arm of a frame  $f^8$ , rigidly secured to the carriage  $I$ . Upon the shaft  $f^7$  is keyed a bevel gear-wheel  $f^9$ , which meshes with another bevel gear-wheel  $f^{10}$ , mounted on a shaft  $f^{11}$ , journaled in another arm of the frame  $f^8$ , and also in the carriage  $I$ . Upon the shaft  $f^{11}$  is keyed a gear-wheel  $f^{12}$ , which meshes with a gear-wheel  $f^{13}$ , mounted on the journal of one of the feed-rollers  $2$ . The gear-wheels  $f^{12}$   $f^{13}$  are so proportioned as to give the required length of stitch when the goods are fed forward. It will be readily seen that by this arrangement the parts will be in a position to operate the feed-rollers in whatever position the carriages  $I$   $I'$  occupy.

It will be seen that in my improvement the carriages  $I$   $I'$  constitute a support for the goods to be sewed. It will likewise be observed that there is a relative movement between the sewing mechanism and said support for the goods.

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

1. In a sewing-machine, the combination, with sewing mechanism comprising a series of needles and fabric-supporting devices, of two carriages movable to and fro each in a direction at right angles to the other, changing the relative position of the sewing mechanism and the fabric-supporting devices at each operation of the needles, and independent movable patterns for the two carriages, substantially as specified.

2. In a sewing-machine, the combination, with sewing mechanism comprising a series of needles, of a carriage movable to and fro in one direction, a second carriage movable to and fro in a direction at right angles to that of the first carriage, work-holders arranged on the upper carriage adjacent to the series of needles, independent rotary patterns for the two carriages, and mechanism, substantially such as described, for causing the movement of the two carriages, substantially as specified.

3. In a sewing-machine, the combination, with sewing mechanism comprising a series of needles, of a carriage movable to and fro in one direction, a second carriage movable to and fro in a direction at right angles to that of the first carriage, work-holders arranged on the upper carriage parallel to the series of needles in the front and rear thereof, independent rotary patterns for each of the two carriages, and mechanism, substantially such as described, for causing the movement of the two carriages, substantially as specified.

4. In a sewing-machine, the combination, with the sewing mechanism comprising a series of needles, of a carriage movable to and fro in one direction, a second carriage movable to and fro in a direction at right angles to that of

the first carriage, work-holders on the upper carriage arranged parallel to the series of needles, one in front and the other in the rear thereof, rotary patterns for the two carriages, 5 rotary shafts controlled by the said patterns, and gearing, substantially such as described, for transmitting motion to the two carriages, substantially as described.

5. In a sewing-machine, the combination, 10 with sewing mechanism comprising a series of needles, of a carriage movable to and fro in one direction, a second carriage movable to and fro in a reverse direction and supported on the first-named carriage, work-holders on 15 the upper carriage, pattern-wheels for causing the described movements of the two carriages, and mechanism, substantially such as described, intermediate of the carriages and pattern-wheels for imparting the movements 20 to the carriages, the mechanism imparting the movement to the laterally-moving carriage comprising a part in sliding connection with another part, substantially as specified.

6. In a sewing-machine, the combination, 25 with sewing mechanism comprising a series of needles, of a carriage movable to and fro in one direction, a second carriage mounted on the first, feed-rollers on the second carriage, rotary patterns, and mechanism, substantially such as described, for causing the 30 movements of the two carriages, and rotary patterns for causing the rotation of the feed-rollers, substantially as specified.

7. In a sewing-machine, the combination, 35 with sewing mechanism comprising a series of needles, of a carriage movable to and fro in one direction, a second carriage mounted on the first, feed-rollers on the second carriage, rotary patterns, and mechanism for 40 causing the movements of the two carriages, and mechanism for rotating the rollers, comprising rotary patterns, bevel-wheels  $f^9 f^{10}$ , and bevel-wheels having a sliding connection with their shafts, substantially as specified.

8. In a sewing-machine, the combination, 45 with feed-rollers for the goods, of a pattern-wheel for controlling the operation of the feed-rollers, a carriage upon which the goods is supported and moved along, mechanism 50 for imparting a reciprocating motion to said carriage, another carriage connected to the carriage first named, mechanism for imparting a reciprocating motion to this carriage in a direction at approximate right angles to 55 the direction of movement of the carriage first named, and pattern-wheels for varying the degrees of reciprocation of the carriages, substantially as specified.

9. In a sewing-machine, the combination, 60 with feed-rollers for the goods, of a carriage upon which the goods is supported and moved along, another carriage connected to the carriage first named, pattern-wheels for varying the degrees of reciprocation of the

carriages, reciprocating bars acting in con- 65 junction with said pattern-wheels, cams for imparting motion to said bars in one direction, springs for imparting motion to said bars in the opposite direction, and mechanism operated through said bars to impart a 70 reciprocating motion to said carriages, substantially as specified.

10. In a sewing-machine, the combination, with carriages I I', of feed-rollers for the 75 goods, mechanism, substantially such as described, for operating said feed-rollers, pattern-wheels C C' C<sup>2</sup> C<sup>3</sup>, bars J' J<sup>2</sup> J<sup>3</sup> J<sup>4</sup>, provided with pins  $j^{16}$ , cams J<sup>7</sup> J<sup>8</sup> J<sup>9</sup> J<sup>10</sup>, ratchet-wheels  $e^5 e^6 e^7 e^8$ , arms e, pawls  $e^{10}$ , arms  $e^9$ , 80 shafts G  $e^4$ , and mechanism, substantially such as described, between the shafts and the carriages for transmitting motion to the latter, substantially as specified.

11. In a sewing-machine, the combination, with carriages I I', of feed-rollers for the 85 goods, mechanism, substantially such as described, for operating said feed-rollers, pattern-wheels C C' C<sup>2</sup> C<sup>3</sup>, provided with sections c c', bars J' J<sup>2</sup> J<sup>3</sup> J<sup>4</sup>, provided with pins  $j^{16}$ , cams J<sup>7</sup> J<sup>8</sup> J<sup>9</sup> J<sup>10</sup>, ratchet-wheels  $e^5 e^6 e^7 e^8$ , 90 arms e, pawls  $e^{10}$ , arms  $e^9$ , shafts G  $e^4$ , and mechanism, substantially such as described, between the shafts and the carriages for transmitting motion to the latter, substantially as specified. 95

12. In a sewing-machine, the combination, with carriages I I', of feed-rollers for the 100 goods, mechanism, substantially such as described, for operating said feed-rollers, pattern-wheels C C' C<sup>2</sup> C<sup>3</sup>, provided with sections c c', bars J' J<sup>2</sup> J<sup>3</sup> J<sup>4</sup>, composed of sections j j' and provided with slip-joints  $j^{17}$  and pins  $j^{16}$ , cams J<sup>7</sup> J<sup>8</sup> J<sup>9</sup> J<sup>10</sup>, ratchet-wheels  $e^5 e^6 e^7 e^8$ , arms e, pawls  $e^{10}$ , arms  $e^9$ , shafts G  $e^4$ , 105 and mechanism, substantially such as described, between the shafts and the carriages for transmitting motion to the latter, substantially as specified.

13. In a sewing-machine, the combination, with carriages I I', of feed-rollers  $f^2$ , a pat- 110 tern-wheel, mechanism, substantially such as described, between the pattern-wheel and the feed-rollers for operating the same, pattern-wheels for varying the degree of reciprocation of the carriages, reciprocating bars 115 acting in conjunction with said pattern-wheels, cams for imparting motion to said bars in one direction, springs for imparting motion to said bars in the opposite direction, mechanism operating through said bars to 120 impart a reciprocating motion to said carriages, gear-wheels  $f^2 f^6$ , frame  $f^4$ , shaft  $f^7$ , gear-wheels  $f^9 f^{10}$ , frame  $f^8$ , gear-wheel  $f^{12}$ , and gear-wheel  $f^{13}$ , substantially as specified.

MATTHIAS KOCH.

Witnesses:

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