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L. SCHULTZ.

QUILTING MACHINE.

No. 456,734. Patented July 28, 1891.

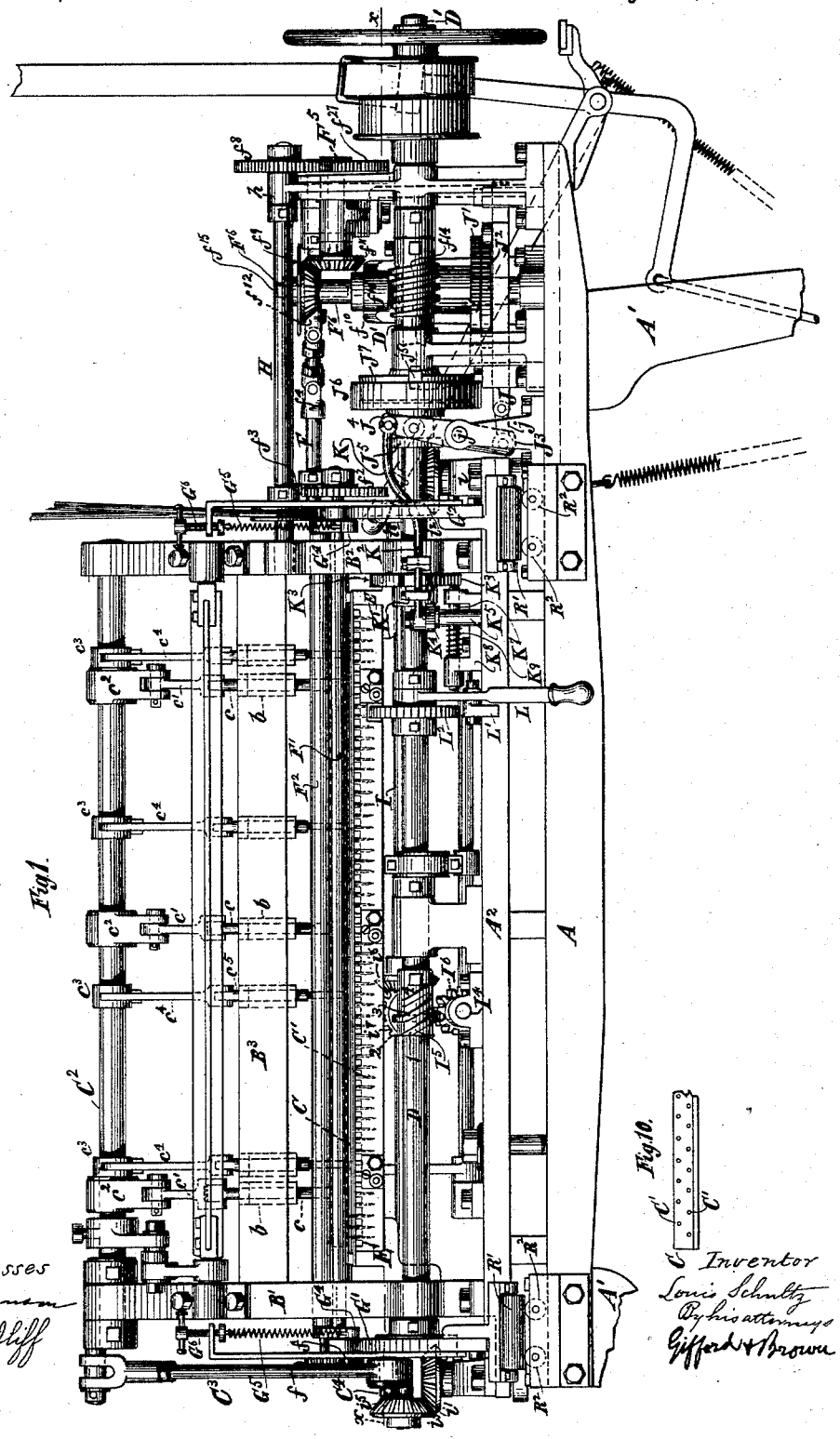

Fig. 1.

Fig. 10.

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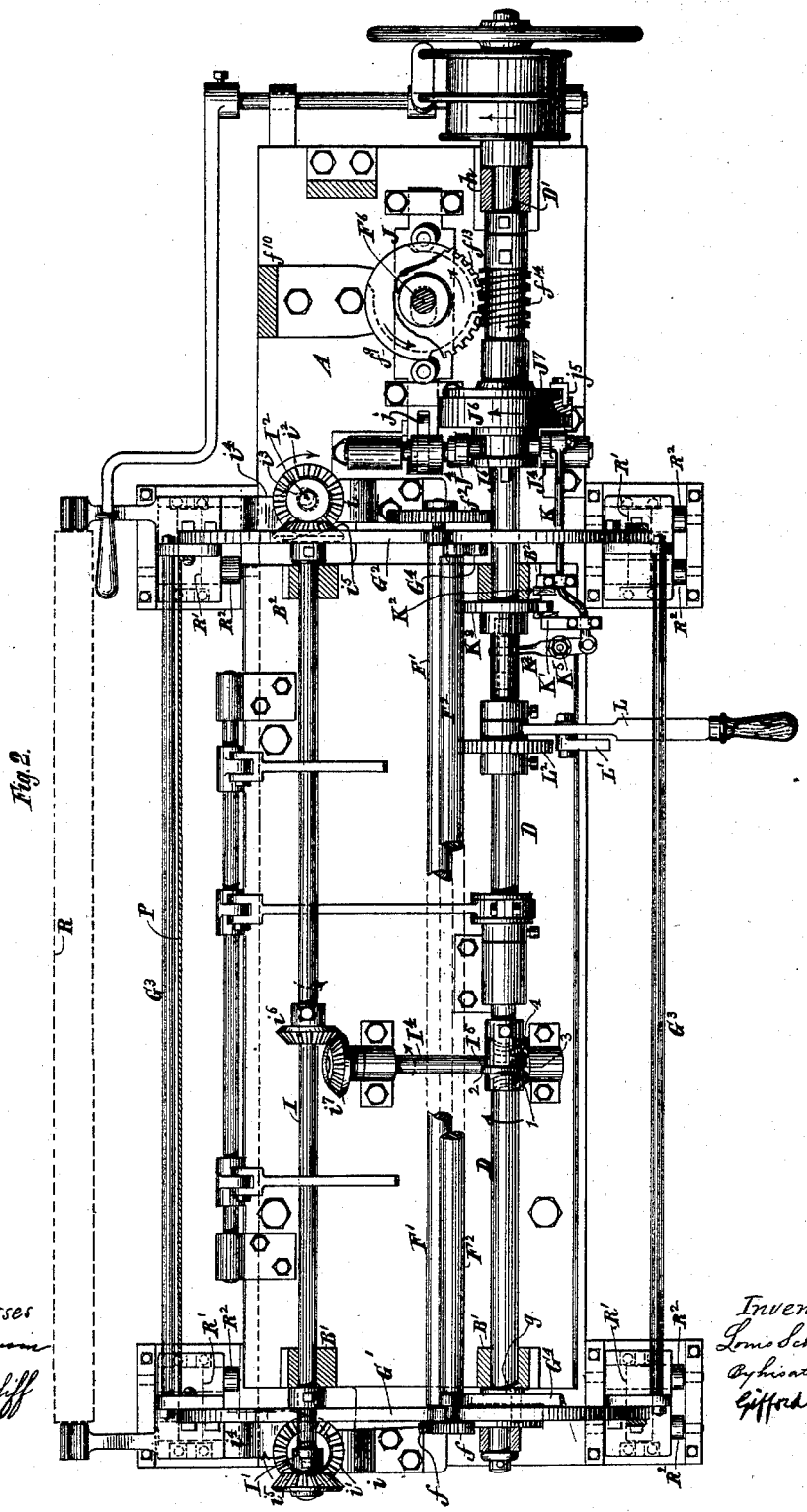

Fig. 2.

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Fig 4.

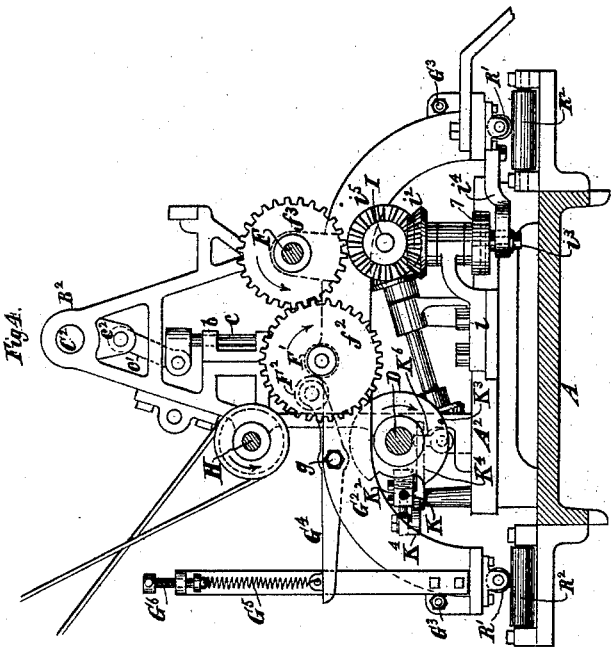
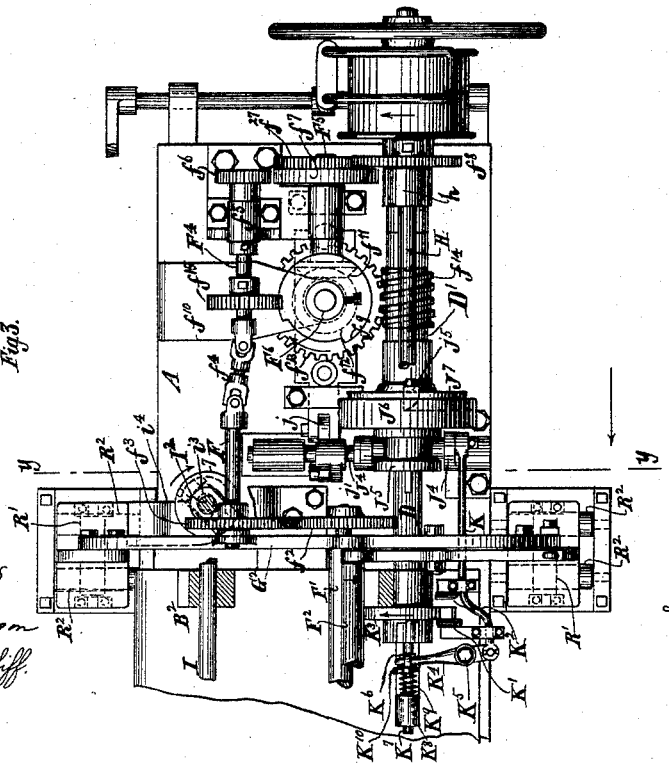


Fig 6.

Fig 3.



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QUILTING MACHINE.

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Fig. 4.

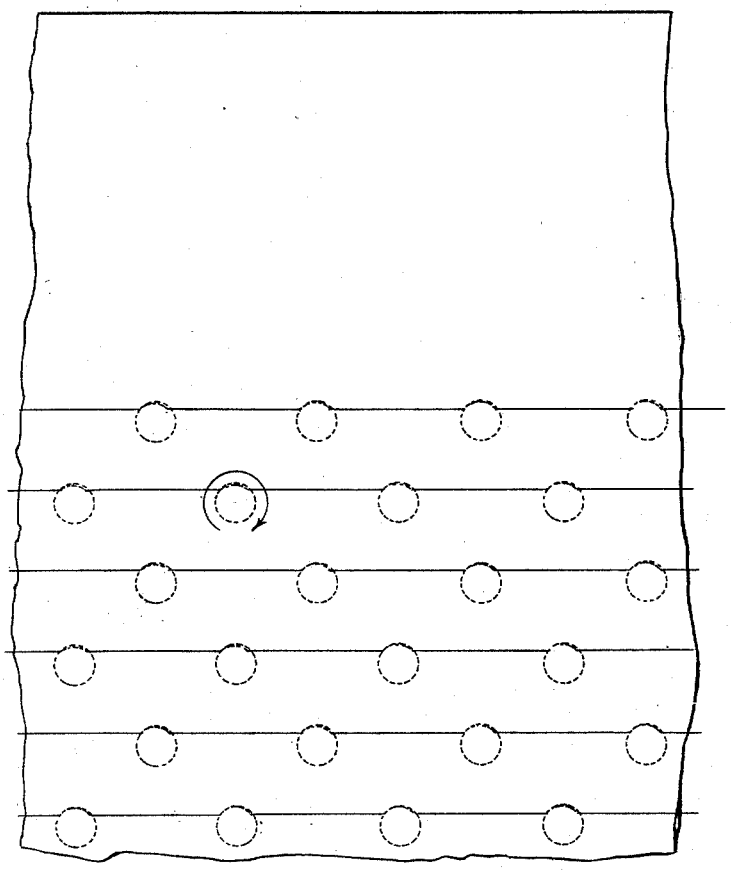

Fig. 5.

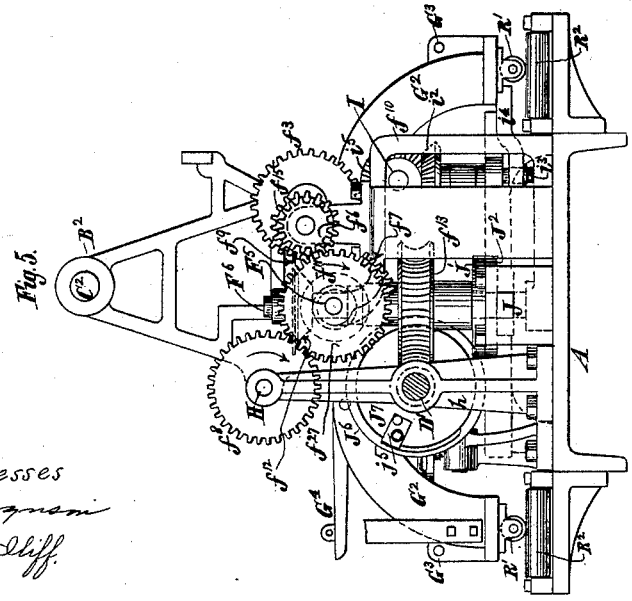

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Fig. 8.

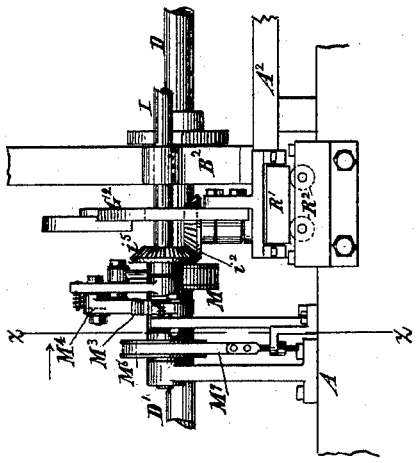

Fig. 7.

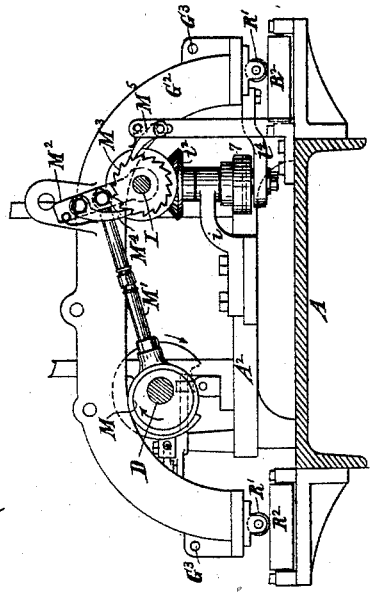

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Fig. 11

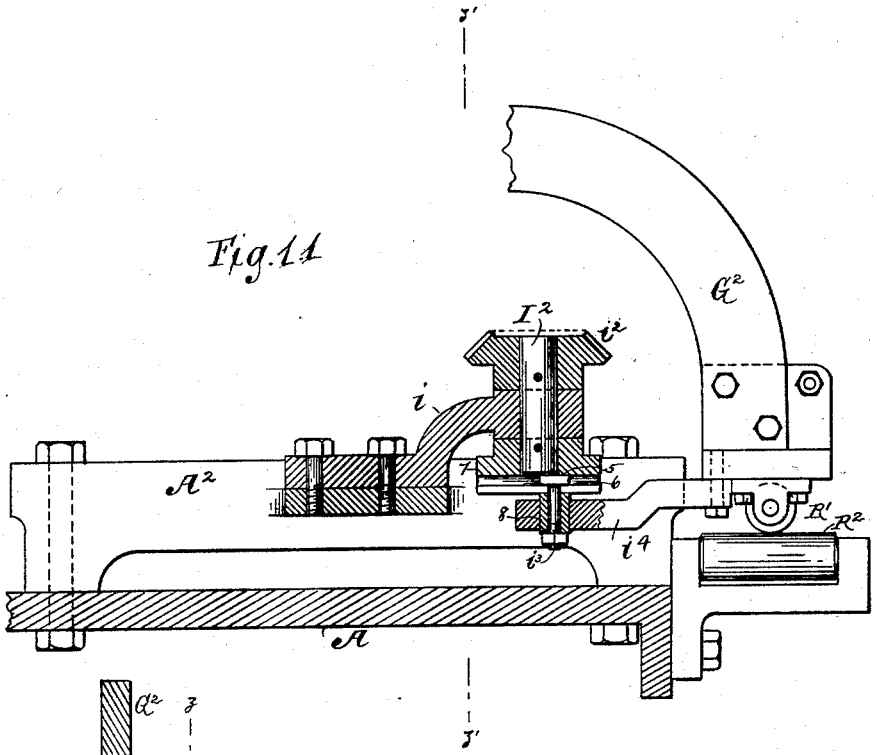


Fig. 12.

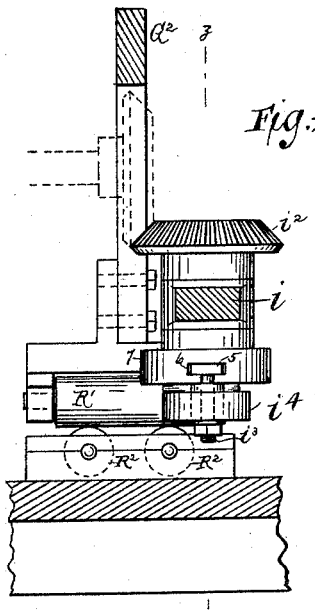
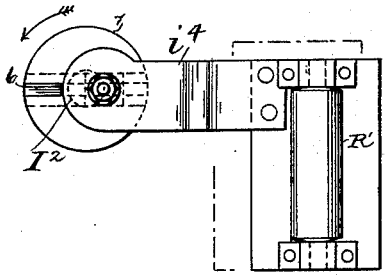


Fig. 13.



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UNITED STATES PATENT OFFICE.

LOUIS SCHULTZ, OF NEW YORK, N. Y., ASSIGNOR TO THE EXCELSIOR QUILTING COMPANY, OF SAME PLACE.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,734, dated July 28, 1891.

Application filed May 29, 1889. Serial No. 312,601. (No model.)

To all whom it may concern:

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

I will describe a quilting-machine embodying my improvement, and then point out the novel features in claims.

In connection with this application reference may be had to my application numbered serially 326,671.

In the accompanying drawings, Figure 1 is a back view of a machine embodying my improvement. Fig. 2 is a horizontal section of the same, taken at the plane of the dotted line *x x*, Fig. 1, certain parts being shown in section and certain other parts being broken away, the better to exhibit the important features. Fig. 3 is a plan or top view of one end portion of the machine, certain parts being removed and certain other parts being shown in section. Fig. 4 is a transverse vertical section taken as indicated by the dotted line *y y*, Fig. 3, and looking in the direction indicated by the arrow which is adjacent to this line. Fig. 5 is an end view of the machine with the driving-pulleys and the appurtenances thereof removed. Fig. 6 is a detail view. Fig. 7 is a transverse section illustrating certain parts and a ratchet mechanism which may be used in connection therewith. Fig. 8 is a front view of certain parts and this ratchet mechanism. Fig. 9 is a diagram illustrating the kind of work which may be performed by this machine. Fig. 10 is an inverted plan of one end portion of the needle-bar and needles. Fig. 11 is a detail, partly in section, through the line *z z* of Fig. 12, showing the connection between a certain shaft and the carriage. Fig. 12 is a detail, partly in section, through the line *z' z'* of Fig. 11. Fig. 13 is an inverted plan view of an arm and its connections.

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

A designates the bed of the machine. It may be supported on legs A' or in any other suitable manner. On this bed A is mounted a table A^2, the latter being slightly elevated.

B' B^2 designate two side frames secured to the table A^2 by bolts or other means, and occupy parallel positions. Between these side frames is secured a cross-bar or stretcher B^3.

C designates the needle-bar. It has secured to it a series of needles C', and these are arranged in two rows, the needles of the second row being behind those of the first row and opposite the spaces between those of the first row, as may be readily understood by reference to Fig. 10.

The needle-bar is provided with a number of upright rods *c*, which work vertically within brackets *b*, attached to the front of the bar B^3. The rods *c* are connected at the upper ends by links *c'* to arms c^2, affixed to a rock-shaft C^2. This rock-shaft imparts a vertically-reciprocating motion to the needle-bar and needles. The shaft has affixed to it other arms c^3, which are connected by links c^4 to rods c^5, which are connected to a presser-foot bar. The rock-shaft is oscillated by means of a rod C^3, which derives motion from a crank C^4. This crank is upon the shaft D of the machine.

E designates the race-bar of the shuttle mechanism. This mechanism may be of any desirable construction and needs no special description.

It will be understood that in the present example of my invention the needles have no motion other than a vertically-reciprocating motion and the shuttles have no motion other than that necessary to coact with the needles.

In the present example of my invention the fabric to be quilted is fed lengthwise beneath the needles, and is also moved laterally. It is fed longitudinally by means of feed-rollers F' F^2, supported by a carriage G' G^2 G^3. The feed-roller F' is journaled in the side frames G' G^2 of the carriage. This carriage consists of two side frames G' G^2 and rods G^3, securing the side frames together. This carriage is free to move in any direction in a horizontal plane. As shown, its side frames G' G^2 have secured to them rollers R'. These rollers R' extend widthwise of the machine, parallel with the needle-bar, and are shown as journaled in brackets fastened to the lower extremities of the side frames. The rollers R' rest upon pairs of rollers R^2, which extend

forwardly and backwardly of the machine, and are journaled in brackets secured to the bed A of the machine. It will be readily understood that the rollers R′ may roll upon the rollers R^2 in the direction of the axes of the latter, which enable the carriage to move backwardly and forwardly, and that the rollers R^2 will rotate under the rollers R′ to enable the carriage to move laterally, or, in other words, in the direction of the length of the needle-bar. The roller F^2 is journaled in levers G^4, which are fulcrumed between their ends by pins or bolts *g* to the side frames G′ G^2 of the carriage. At the rear ends the levers G^4 are connected to springs G^5. The latter are secured by screws G^6 to upright bars fastened to the side frames of the carriage. The springs force the roller F^2 with greater or less pressure against the roller F′.

The fabric to be quilted is at first rolled on a roller R. It is drawn thence over an apron P beneath the needles by means of the feed-rollers. The roller R and the apron P are of course connected with the carriage, so as to move with it. The feed-rollers F′ F^2 are geared together by gear-wheels *f*, affixed to their journals at one end. The feed-roller F′ has affixed to it a gear-wheel f^2. The gear-wheel f^2 derives motion from a gear-wheel f^3, affixed to a shaft F. The shaft F is supported at one end in the side frame G^2 of the carriage. The shaft F is not intended to partake of the lateral movement of the carriage. Therefore there must be a relative sliding movement between the carriage and the shaft F. The gear-wheel f^3 is to be secured to the shaft F by means of a spline or feather and connected to the bearing of the carriage receiving the shaft F, so that said gear-wheel will move with the carriage and slide along the shaft F for this purpose. The shaft F is connected by a universal joint f^4 to a shaft F^4. This shaft F^4 is supported in a bearing f^5, which is secured to the bed A of the machine. The universal joint between the shafts F and F^4 provides for the movement of the carriage forwardly and backwardly. Owing to the sliding connection of the shaft F with the carriage and with the gear-wheel f^3, carried by the carriage, and the connection of the shaft F with the shaft F^4 by the universal joint f^4, provision is afforded for the movement of the carriage in any and all directions in a horizontal plane without interfering with the transmission of rotary motion to the feed-rollers.

The shaft F^4 has affixed to it a gear-wheel f^6. This derives motion periodically from a toothed segment f^7, affixed to a shaft F^5. The shaft F^5 is supported in a bearing affixed to the bed A. This shaft F^5 has affixed to it a gear-wheel f^{27}, that engages with a gear-wheel f^8, affixed to a shaft H, journaled at one end in a bracket *h*, affixed to the bed A and journaled at the other end in the side frame B^2 of the machine. The shaft F^5 has affixed to it a bevel gear-wheel f^{11}, which engages with a bevel gear-wheel f^{12}, affixed to the upright shaft F^6. The upright shaft F^6 is journaled in a bracket f^{10}, erected upon the bed A. The shaft F^6 has affixed to it a worm gear-wheel f^{13}. This derives motion from a worm f^{14}, affixed to the driving-shaft D′. The shaft F^5 therefore moves constantly with the driving-shaft D′; but it transmits motion to the shaft F^4 and thence to the feed-rollers only periodically, owing to the fact that no motion is transmitted from the driving-shaft to the shaft F^4, saving only at the brief periods when the toothed segment f^7 engages with the gear-wheel f^6.

On the shaft F^4 there is affixed a lock-wheel f^{15}. This coacts with a stop flange or disk f^9, affixed to the shaft F^6. The stop flange or disk f^9 is circular in form, but has a notch or opening in its periphery. Except when this notch comes opposite the lock-wheel f^{15}, the stop flange or disk engages with the lock-wheel f^{15} and holds the latter against rotation. While the shaft F^4, carrying this lock-wheel, is thus held against rotation the feed-rollers are precluded from rotating. One end of the notch or opening in the stop flange or disk comes opposite the lock-wheel f^{15} just before one end of the toothed segment f^7 enters into engagement with the gear-wheel f^6 of the shaft F^4, and the notch or opening is not carried beyond the lock-wheel until after said toothed segment has gone out of engagement with the wheel f^6. It follows, therefore, that the stop flange or disk locks the shaft F^4 and the feed-rollers at all times, except when the toothed segment f^7 engages with the wheel f^6 to rotate said shaft F^4 and the feed-rollers.

Having now described the mechanism by which rotary motion is imparted to the feed-rollers and explained the motions which are imparted to the carriage, I will now give a detailed explanation of the means which serve to produce the motions of the carriage. I′ I^2 designate two upright shafts journaled in brackets *i*, secured on the table A^2. On these shafts are affixed bevel gear-wheels i' i^2. These shafts I′ I^2 have also affixed to them cranks i^3, which enter holes in arms i^4, that are affixed rigidly to the side frames G′ G^2 of the carriage. The cranks i^3 are not fixedly secured to the shafts I′ I^2; but they are fastened to blocks 5, which slide in grooves 6 in disks 7. The disks 7 are secured to the shafts I′ I^2. Their grooves 6 are open at the under side and extend diametrically across them. The cranks are made in the form of screws or bolts which engage with tapped holes in the blocks 5 and extend through the blocks and bear against the top wall of the grooves. On these screws or bolts forming the cranks are rollers 8, and these rollers enter and turn freely within the holes in the arms i^4. It will readily be seen that by turning the screws or bolts 5, forming the cranks, so as to unclamp the blocks 5, the blocks may be shifted so as to vary the eccentricity of the bolts forming the cranks relatively to the axes of the shafts

I′ I². When the screws or bolts have thus been adjusted, they may be turned so as to clamp the blocks again and then will be secured in the new position. By adjusting the cranks in this manner they will be made to describe a larger or a smaller circle when the shafts I′ I² are rotated. The bevel gear-wheels i' i^2 of the shafts I′ I² engage with bevel gear-wheels i^5, affixed to a shaft I, journaled in bearings in the side frames B′ B². The shaft I rotates the shafts I′ I² in unison. Obviously as the shafts I′ I² rotate their cranks i^3 will move the carriage in a circle. The work will therefore be moved in a circular line beneath every one of the needles. There will result a number of circles of stitches, as represented in Fig. 9. The threads may be carried between each two adjacent circles produced by the same needle, as represented by the full lines in Fig. 9. The manner in which this can be done will appear hereinafter.

Let me now explain the manner in which rotary motion is imparted to the shaft I, whereby the upright shafts I′ I², which move the carriage, are rotated. It will be seen that there is affixed to the shaft I a bevel gear-wheel i^6. This bevel gear-wheel derives motion from a bevel gear-wheel i^7, affixed to a shaft I⁴, journaled in bearings affixed to the table A². This shaft I⁴ is driven by threads I⁵, carried by the shaft D. The threads I⁵ of the driving-shaft engage with a worm-wheel I⁶, affixed to the shaft I⁴. The threads I⁵ in effect constitute a cam which intermittently rotates the shaft I and at other times locks it, and which therefore periodically moves the carriage in a circular path and then holds it stationary. One thread at the beginning 1 extends spirally around the shaft D for about a quarter of the circumference, and then at 2 extends in a plane at right angles to the axis of the shaft about three-quarters of the way around the circumference, and at the extremity 3 extends spirally for about a quarter of the circumference of the shaft. The spirally-extending extremities 1 and 3 are of the same pitch, parallel and opposite one another. Beyond and parallel with these is a spiral thread-segment 4, extending about a quarter around the circumference of the shaft. The construction of the threads may best be understood by reference to Fig. 1.

In Figs. 7 and 8, I have illustrated a slight modification of the mechanism for imparting motion to the carriage. On the shaft D, between the female clutch-piece J⁶ and the adjacent side frame B² and the adjacent side frame G² of the carriage, is mounted an eccentric M. To this is fitted a strap connected with a rod M′. The rod M′ is pivotally connected to a lever M², mounted loosely upon the shaft I, the latter being continued considerably beyond the side frame B² to admit of this. On the shaft I is affixed a ratchet-wheel M³. A pawl M⁴ is pivotally connected to the lever M² and engages with the ratchet-wheel M³. When the eccentric M oscillates the lever M², it causes the pawl to intermittingly rotate the ratchet-wheel and to thus rotate the shaft I intermittingly. The shaft in this manner therefore receives the same motion that would be transmitted to it by the thread I⁵, the wheel I⁶, the shaft I⁴, and the bevel-wheels i^7 i^6, previously described. These parts, which I have just explained in connection with Figs. 7 and 8, therefore form a mechanism which may be substituted for the parts in the other figures which I have just mentioned. A stop-pawl M⁵ prevents the ratchet-wheel M³ from rotating in the wrong direction. The shaft I has affixed to it a brake-wheel M⁶. Over this passes a brake-strap M⁷, which at the ends is fastened to brackets secured to the bed-piece A. At one end the strap has a screw which passes over the corresponding bracket and has applied to it beneath the bracket a nut. By adjusting the nut the tension of the brake-strap may be varied.

I have now explained the motions of the feed-rollers and the movements of the carriage necessary for the production by each needle of a circle of stitching. I will now describe a mechanism whereby the operation of the needles and shuttle will be temporarily suspended to enable the fabric to be fed a certain distance preparatory to the quilting upon it of another set of circles. This suspension of the function of the operation of the needles and shuttles is for the purpose of enabling the fabric to be fed the distance indicated by the full lines extending between the dotted circles in Fig. 9. On the shaft F⁶ are twin cams J′ J². These operate in conjunction with bowls arranged upon a sliding plate J. This sliding plate J is connected by a link j with an arm J³, affixed to a rock-shaft j', which is journaled in brackets or stands erected upon the bed A. The rock-shaft has affixed to it arms J⁴, which are provided with bowls or rollers entering a circumferential groove in a sleeve J⁵, which fits upon the shaft D. This sleeve is free to be moved lengthwise of the shaft D; but it is locked to rotate with the shaft D by means of a feather or spline. This sleeve has affixed to it one part of a clutch. In the present instance it is shown as having the female part J⁶ secured to it. The other part J⁷ of the clutch is secured to the shaft D′. The clutch may be of any suitable construction. In the present instance the female part consists of an internally-conical flange, and the male part is circumferentially conical to engage with said flange. The male part is shown as being provided with a projection j^5, that enters a groove in the female part when the two parts of the clutch engage, and which will encounter the shoulder at the end of this groove to prevent any improper slipping between these two parts. Lest the purpose of this clutch is not apparent, I will explain that whenever the parts of the clutch are disengaged the move-

ment of the carriage in a circular path will be terminated and the operation of the needles and shuttles will be suspended. As the feed-rollers are, however, rotated through the driving-shaft D′, that will continue rotating to feed the fabric. The feed then produced is the feed from the front to the back of the machine, which is indicated by the straight full lines in Fig. 9. It will be understood that the cams J′ J² effect the disconnection of the shaft D from the driving-shaft D′ once in every rotation of the upright shaft F⁶, which carries the cams. To one of the arms J⁴, which serves to effect the shifting of the female clutch J⁶, is pivotally connected a rod K. The rod K is provided with brake-pads K′ K² for acting one at a time upon a flange K³, with which the shaft D is provided. This rod K is pivotally connected to one end of a lever K⁴, which is fulcrumed between its ends to a stud K⁵, erected on the table A². The lever K⁴ enters an eye extending from a collar K⁶, which loosely surrounds a bolt K⁷, sliding in a bearing K⁸, affixed to the table A². A spiral spring K⁹ surrounds this bolt. At one end this spring rests against the bearing K⁸ and at the other end against a cross-pin K¹⁰, which is inserted in the bolt. The spring tends to move the bolt toward the flange K³. When the lever K⁴ is oscillated in that direction in which it is oscillated when the female clutch-piece is moved into engagement with the male clutch-piece, the lever moves the collar K⁶ along the bolt, so as to compress the spring K⁹, and at the same time the brake-pad K′ is moved into contact with the flange K³. When the female clutch-piece is disengaged from the male clutch-piece, the rod K is moved in such direction as to withdraw the brake-pad K′ from the flange K³ and move the brake-pad K² into contact with said flange. The rod K will also at this time oscillate the lever K⁴, so as to cause the latter to move the collar K⁶ toward the flange K³. This movement of the collar will leave the spring free to force the bolt K⁷ into a hole in the flange to positively stop the shaft D. The brake-pads are for the purpose of keeping the shaft D under control, and the brake-pad K² is designed to gradually arrest the motion of said shaft before the bolt engages with it. It will be seen that the driving-shaft D′ is provided with fast and loose pulleys and a hand-wheel to adjust the shaft by hand when necessary. The shaft D has loosely mounted upon it an arm L, carrying a pawl L′, operating in conjunction with a ratchet-wheel L², affixed to the shaft D, so that said part D and the parts deriving motion from it can be adjusted by hand.

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

1. In a sewing-machine, the combination of a carriage for moving the material to be stitched in a circular or a similar path, mechanism for causing the requisite movement of the carriage, feed-rollers supported by the said carriage, mechanism for operating them so as to remain stationary during the movement of the carriage and to rotate while the carriage is at rest, and a series of needles arranged in two rows, substantially as specified.

2. In a sewing-machine, the combination of a carriage, feed-rollers journaled in said carriage at the front and rear to sustain the material to be stitched, mechanism for moving the carriage in a circular or a similar path, mechanism for holding the feed-rollers stationary during the said movement of the carriage and for rotating the feed-rollers when the carriage is at rest, and a series of needles arranged in two rows, substantially as specified.

3. In a sewing-machine, the combination, with a series of needles arranged in two rows, of a carriage, mechanism for moving the carriage in a circular or a similar path, feed-rollers journaled in said carriage, a shaft journaled in a stationary part of the machine for transmitting motion to the feed-rollers, a universal joint between the feed-rollers and said shaft, a gear-wheel on said shaft, and a toothed segment carried by a rotary shaft and engaging periodically with the said gear-wheel to rotate the feed-rollers, substantially as specified.

4. In a sewing-machine, the combination, with a series of needles arranged in two rows, of a carriage, mechanism for moving the carriage in a circular or a similar path, feed-rollers journaled in said carriage, a shaft journaled in a stationary part of the machine for transmitting motion to the feed-rollers, a universal joint between the feed-rollers and said shaft, a gear-wheel on said shaft, a toothed segment carried by a second shaft, a locking-wheel on the first-mentioned shaft, and a stop flange or disk having a notch in its periphery and carried by a third rotary shaft, the notch of said stop flange or disk being opposite the locking-wheel on the first-mentioned shaft when the toothed segment is in operation, substantially as specified.

5. In a sewing-machine, the combination, with a series of needles arranged in two rows, of a carriage, feed-rollers journaled in said carriage, mechanism for rotating the feed-rollers at intervals, cranks for moving the carriage in a circular path, a driving-shaft, and a main shaft connected by a clutch with the driving-shaft and imparting motion to the cranks which move the carriage, substantially as specified.

6. In a sewing-machine, the combination, with a series of needles arranged in two rows, of a carriage for moving a fabric in a circular or a similar path, said carriage having cylindric rollers journaled to it, and a bed having cylindric rollers journaled to it, arranged at right angles to the said rollers of the carriage, substantially as specified.

7. In a sewing-machine, the combination, with a series of needles arranged in two rows, of a carriage movable in a circular or a simi-

lar path, feed-rollers journaled in the carriage, a horizontal shaft for imparting rotary motion to the feed-rollers, a rotary segment for driving this shaft, a driving-shaft, a main horizontal shaft for effecting the said movement of the carriage, a clutch between the last-mentioned shaft and the driving-shaft, and an upright shaft rotated by the driving-shaft, intermittingly locking and unlocking with the shaft which imparts the rotary motion to the feed-rollers and for clutching and unclutching with the driving-shaft the said main shaft and effecting the movement of the carriage, substantially as specified.

8. In a sewing-machine, the combination, with a series of needles, a carriage for moving a fabric in a circular or similar path, and feed-rollers journaled in said carriage and operated so as to remain stationary during the movement of the carriage and to rotate while the carriage is at rest, of the shaft D, the shaft D′, a clutch between these shafts, a lever for moving one of the clutch-pieces, and a brake operating upon the shaft D to arrest its motion when it is unclutched, substantially as specified.

9. In a sewing-machine, the combination, with a series of needles, a carriage for moving a fabric in a circular or similar path, and feed-rollers journaled in said carriage and operated so as to remain stationary during the movement of the carriage and to rotate while the carriage is at rest, of the shaft D, the shaft D′, a clutch between these shafts, a lever for moving one of the clutch-pieces, and a locking-bolt operated on the unclutching of the shaft D to lock this shaft, substantially as specified.

10. In a sewing-machine, the combination, with a series of needles, of a carriage movable in a circular or a similar path, feed-rollers journaled in the carriage, mechanism for imparting motion to the feed-rollers and carriage alternately, and comprising a shaft D′, a shaft D, a clutch J^6 J^7, and a brake K′ K^3, operating in unison with the movable part of the clutch to coact with a disk or flange on the shaft D, substantially as specified.

11. In a sewing-machine, the combination, with a series of needles, of a carriage movable in a circular or a similar path, feed-rollers journaled in the carriage, mechanism for imparting motion to the feed-rollers and carriage alternately, and comprising a shaft D′, a shaft D, a clutch J^6 J^7, provided, respectively, with a shouldered projection and a groove, a brake operated in unison with the movable part of the clutch, a disk or flange affixed to the shaft D, and shouldered projections on the brake and disk or flange, substantially as specified.

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