

(No Model.)

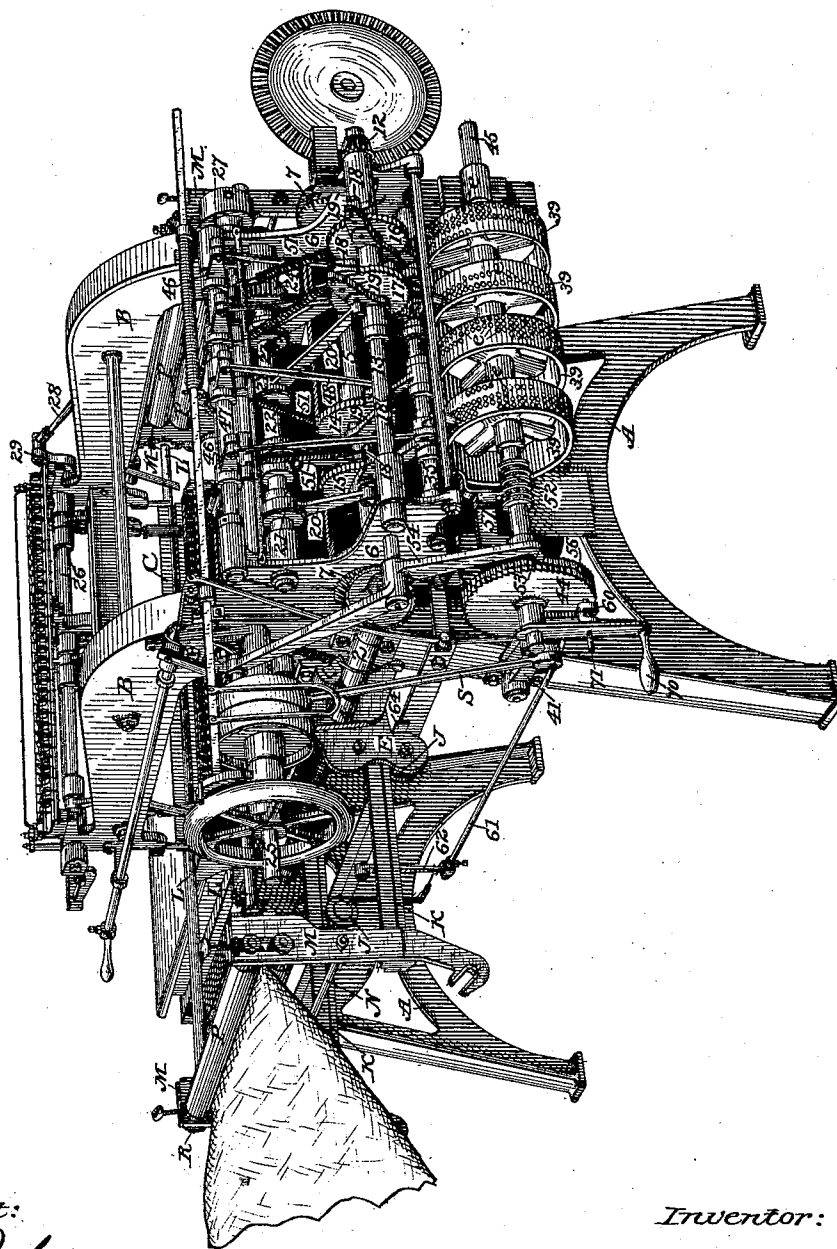
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W. KOCH.
QUILTING MACHINE.

No. 467,134.

Patented Jan. 12, 1892.

Fig. 1.



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(No Model.)

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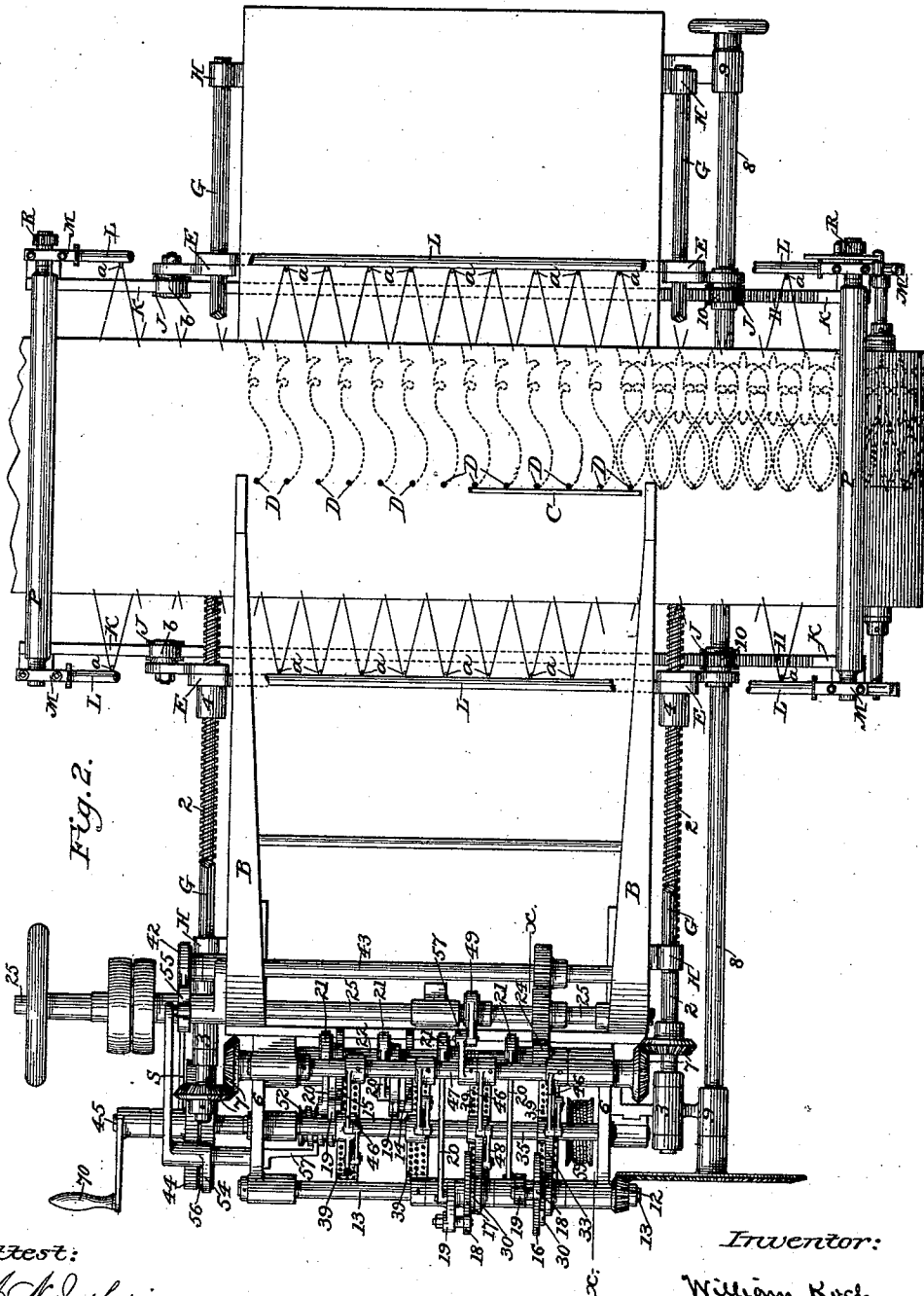


Fig. 2.

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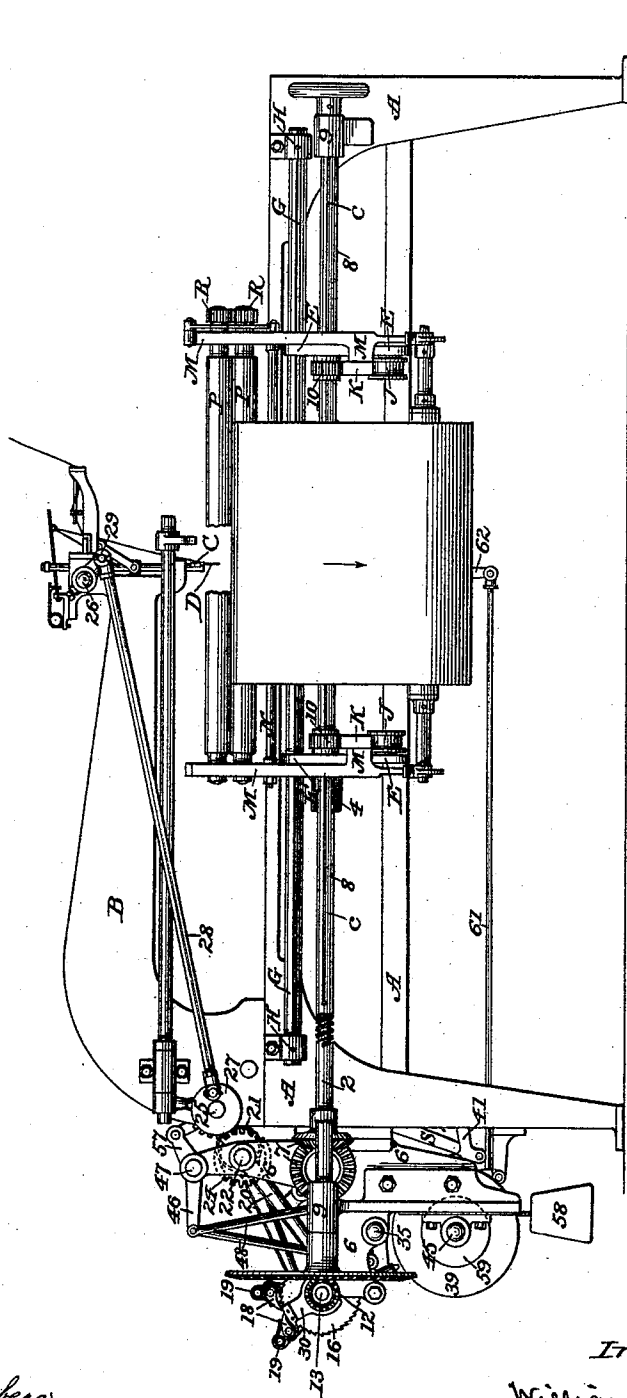
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Fig. 3.



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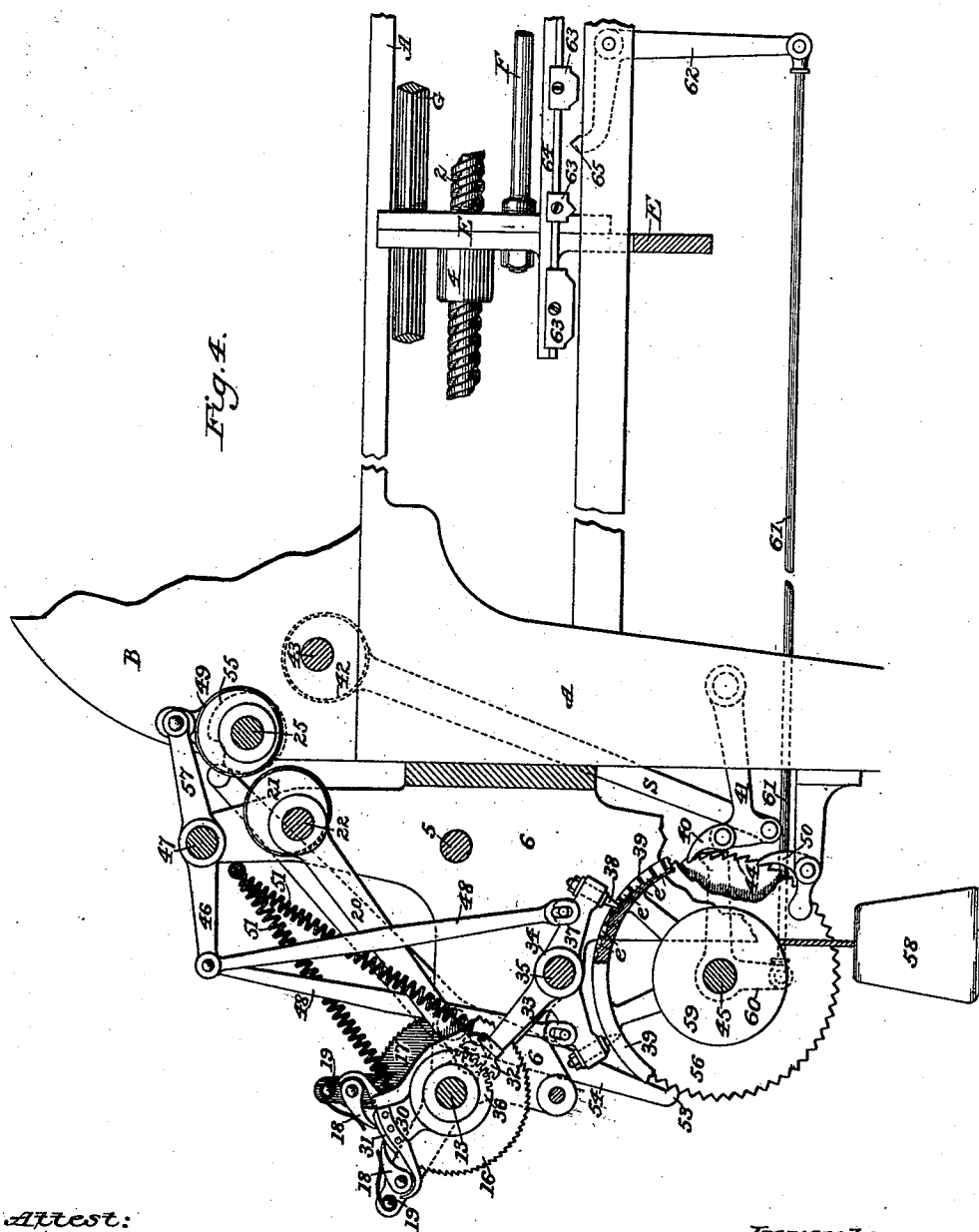
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W. KOCH.
QUILTING MACHINE.

No. 467,134.

Patented Jan. 12, 1892.



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QUILTING MACHINE.

No. 467,134.

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Fig. 6.

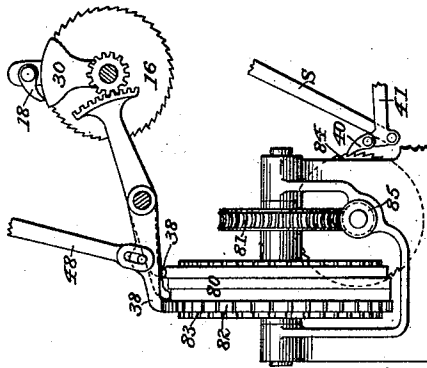
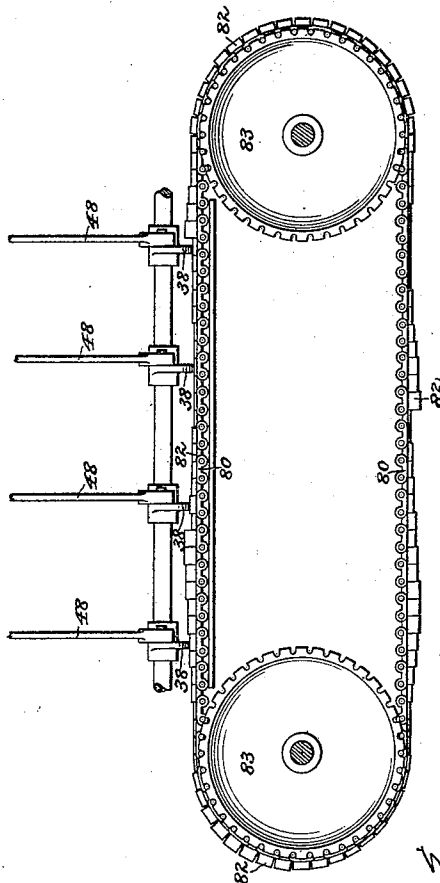


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM KOCH, OF NEW YORK, N. Y.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,184, dated January 12, 1892.

Application filed April 14, 1888. Serial No. 270,661. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KOCH, of the city, county, and State of New York, have invented certain new and useful Improvements in Quilting-Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, making
10 a part of this specification, in which—

Figure 1 is an elevation in perspective of a quilting-machine embodying my invention; Fig. 2, a plan view of the same, the mechanism for operating the needles being omitted and the side rails of the cloth-carriage and the guide-rails upon which it slides partly broken away; Fig. 3, a side elevation of the entire machine; Fig. 4, a longitudinal vertical section in line *x x* of Fig. 2 of so much of
20 the machine as is necessary to illustrate the pattern-controlling devices; and Fig. 5, a front elevation of a modification of the same, Fig. 6 being an end view thereof.

My invention relates, especially, to compound sewing-machines constructed for quilting in various patterns, the patterns being produced by differential movements, either of the fabric under the needles or of the needles over the fabric, occurring between each stroke
30 of the needles while the machine is in action.

It has for its object to form automatically with a single straight row of needles lines of stitching in conformity with any desired pattern and involving either straight or curved lines or combinations of straight and curved
35 lines. This object is attained by means of a combination and arrangement of devices, substantially as hereinafter described and claimed, whereby a suitable double carriage, made either to support the fabric to be quilted under the needles or the needles over the fabric, is automatically driven with a compound
40 movement, which may be varied at will in a direction parallel with the row of needles and simultaneously or otherwise in a direction at right angles thereto. This double or compound movement of the carriage is preferably produced by means of two parallel rotating shafts, the one geared to one section
50 of the carriage, which is mounted to move in a direction parallel with said shafts, and the other to a second section of the carriage

mounted to move upon the first in a direction at a right angle to the first, each of said shafts being so journaled and geared as to admit of being driven intermittently in either
55 direction by the action of two independent reciprocating pawls fitted to engage severally two opposed ratchet-wheels secured to the shaft, the engagement of each pawl with its ratchet and the time and duration of such engagement being controlled by a segmental
60 controlling-plate, whose position in relation to the pawl is determined by a pivoted lever terminating in a finger, which rests upon or
65 in contact with an indented or perforated or otherwise systematically-irregular surface serving as a pattern, said surface being made to move systematically under the finger in synchronism with the reciprocating movement of the needles, all as hereinafter more
70 fully described.

In the accompanying drawings, A A represent the frame-work of a "Jacquard" quilting-machine constructed in accordance with my
75 invention, and in which the fabric to be quilted is carried to and fro under the needles upon a double carriage.

B B, Fig. 3, are the curved standards, which serve to support in the customary manner the
80 needle-bar, the presser-foot bar, the thread-controlling devices, and the rock-shaft actuating the needle-bar. By preference the needles D D are secured to the needle-bar C in a single straight row. (See Fig. 2.)
85

The fabric to be quilted is stretched upon a quilting-frame constructed of corner-posts M M, end bars N N, and longitudinal side bars K K and L L, and which constitutes one section of the carriage. This quilting-frame is
90 made longer than the width of the machine, so as to permit it to traverse back and forth across the machine under the needle-bar in a direction parallel therewith. The upper side bars L L are carried over and the lower
95 side bars K K under the cloth-plate of the machine, and the frame is supported by and moved freely upon idle-rollers J J, on which the bars K K rest and ride. These rollers revolve upon stud-pins on the opposite inner
100 faces of carrier-plates E E, which are mounted to slide freely transversely to the length of the needle-bar upon fixed guide-rails G G, which extend parallel with the side bars of

the frame A A and are supported proximately to said frame in brackets H H, as shown in Figs. 2 and 3. These carrier-plates E E on each side of the machine are united by cross-
 5 rods F F (see Fig. 4) to slide together upon the rail G, and the two pairs of carrier-plates constitute the second or lower section of the carriage and serve, as set forth, to support
 10 upon the rollers J J the transversely-moving quilting-frame K L M N, constituting its first or upper section. The bars K K are held upon rollers J J by means of auxiliary friction-rollers b b and pinions 10 10, (see Fig. 2,) bearing upon their upper edges and which
 15 turn upon stud-pins fixed in the plates E E, parallel with the axes of said rollers J J.

Feed and tension rollers P P are mounted in pairs to rotate in bearings formed therefor in the end posts M M of the quilting-frame
 20 at the ends of its upper side rods L L and on a level with the cloth-plate of the machine, each pair of rollers being geared together by end pinions R R and controlled by suitable pawls engaging said pinions.

The side rods L L are provided with hooks a a along the length thereof, as shown in Fig. 2, by means of which, in combination with the end rollers P P, the fabric to be stitched may be properly stretched and secured for
 30 quilting, as in a quilting-frame.

Various methods will undoubtedly suggest themselves to a skilled mechanic for mounting the quilting-frame, so that it shall be free to move in four directions under the needle-
 35 bar and needles—viz., back and forth in a line parallel therewith and to and fro in a line at a right angle thereto—and I contemplate the use of such equivalent devices in carrying my invention into effect, the inven-
 40 tion having reference more particularly to the devices for actuating such a frame, so that it may move simultaneously in two different directions and for producing an automatic variation in any or all of its movements in
 45 accordance with a definite plan or pattern.

The quilting-frame or upper section of the carriage is moved in lines at a right angle to the length of the needle-bar C by sliding the carrier-plates E E of the lower section of the
 50 carriage back and forth upon the rails G G, and this is accomplished, preferably, by means of two threaded shafts or endless screws 2 2, mounted to rotate in fixed bearings 3 3 on each side of the machine, parallel with the rails G
 55 G, said screw-shafts being made to work through nuts 4 4, secured to each carrier-plate E, as shown in Fig. 2.

The reciprocation of the quilting-frame or upper section of the carriage in a direction
 60 coincident with the length of the needle-bar C and of the row of needles is produced by means of a rack 11, formed upon the upper side of each lower side bar K of the frame, and which is engaged by a pinion 10, fixed
 65 upon a shaft 8, mounted to rotate in suitable bearings 9 9 upon one side of the machine, parallel with the endless screws 2 2. The

pinions 10 10 are feathered upon the shaft, each by means of a spline engaging a longitudinal slot c therein, so that while the pinions will partake of the rotary movement of
 70 the shaft they will be free to slide longitudinally thereon, as shown in Figs. 2 and 3. The two endless-screw shafts 2 2 are made to rotate in unison by means of a transverse shaft
 75 5, (see Fig. 1,) mounted in end brackets 6 6 in the frame A A of the machine and which is geared at each end to said shafts 2 2 by beveled gear 7 7, as shown in Figs. 1, 2, and 3.

The shaft 8 is geared by a bevel-gear 12 to 80 a driving-shaft 13, mounted likewise in the end brackets 6 6, parallel with the shaft 5, as shown in Figs. 1 and 2. Each of the shafts 5 and 13 is fitted with two ratchet-wheels secured thereto, and which are alike in all re-
 85 spects save that their teeth are severally inclined in opposite directions, the opposed ratchets on the shaft 5 being indicated, as shown in Fig. 1, by the numerals 14 and 15, and on the shaft 13 by the numerals 16 and
 90 17. Each ratchet-wheel is engaged by a spring-actuated pawl 18, pivoted to an arm 19, swinging upon the axial shaft upon which the wheel is fitted, and as the two ratchets
 95 upon each shaft are opposed the one to the other the oscillation of one of the radial pawl-arms will operate to turn the shaft in one direction and the movement of the other arm will operate to turn it in the opposite di-
 100 rection, the one pawl-being necessarily held out of engagement, in manner as hereinafter described, while the other is in action.

Each pawl-arm 19 is coupled by a connecting-rod 20 to an eccentric 21 upon a rotating
 105 shaft 22, mounted parallel with the shafts 5 and 13, and the eccentrics for the several arms are all made to correspond, so that the length of stroke is the same for each pawl. The pawl-actuating shaft 22 is geared by toothed wheels
 110 24 (see Fig. 2) to a master-shaft 25, mounted in the frame A A of the machine, as shown in Figs. 1 and 2, and from which the movements of all its parts are derived. The connecting-rods 20 for the pawl-arms of the two
 115 ratchet-wheels 15 and 17, whose teeth incline in the same direction, are alike pivoted to said arms intermediate the shaft and pawl, so that the two arms will move in unison in the same direction, while the connecting-rods for the
 120 pawl-arms of the remaining two corresponding ratchet-wheels 14 and 16 are each pivoted to an extension of its appropriate arm projecting radially on the opposite side of the shaft, (see Fig. 4,) so that these two arms will
 125 likewise move in unison, but in an opposite direction to the first, said movements being all produced by the continuous rotation of the shaft 22 in the same direction.

As the two ratchet-wheels upon each shaft 5 and 13 are, by reason of the opposite in-
 130 clination of their teeth, made to turn in opposite directions when actuated by the oscillation of their pawls, it is evident, as above stated, that when the pawl of either wheel is

brought into engagement therewith the pawl of the other wheel must be held out of engagement. By controlling, therefore, the engagement of these several actuating-pawls the rotation of either shaft 5 or 13 may be reversed at pleasure according as the pawl for the one ratchet-wheel or the other is allowed to come into action.

The rock-shaft 26, by which the needle-bar C is actuated, is made to oscillate in the customary manner—once at each rotation of the master-shaft 25—by means of an eccentric 27 on the end of the master-shaft, connected by a coupling-rod 28 with a crank-arm 29 on the end of the rock-shaft. (See Fig. 3.) The four pawls 18 18 18 18 being all actuated by means of similar eccentrics upon the shaft 22, geared to the master-shaft, have all the same reciprocating movement and are all made to swing simultaneously at each rotation of said master-shaft, once back and forth, with the same length of stroke over similar arcs in unison with each reciprocating movement of the needle-bar, and with each stroke of the needles operating to produce a single stitch. The full extent of the movement of the several pawls, or, in other words, the length of the arc over which they are made to sweep, is so proportioned that if a pawl be in engagement with the ratchet-wheel throughout the whole of the stroke the cloth will, by the rotation of the shafts 5 and 13 and of the shafts geared thereto and which actuate, as described, the carriage and quilting-frame, be moved under the needles in the appropriate direction the maximum distance required for a single stitch.

I do not by my invention seek to vary the stroke of the pawls in order to vary the extent of movement of the cloth; but while the pawls all make uniformly a stroke of the same length between each stroke of the needles the engagement of each pawl with its ratchet is so controlled automatically that it is prevented altogether when required or is permitted during its entire stroke or during a portion thereof only, and by this independent control of the engagement of the several pawls with the ratchet, by which the movements of the cloth under the needles (or as an equivalent of the needles over the cloth) are mediated produced, I am enabled to cause the needles to follow and describe any desired patterns.

As the several pawls are each controlled by a device of the same character operated from the same actuating-shafts, I need only describe herein the mechanism relating to one of said pawls, and have selected for this purpose the pawl actuating the ratchet-wheel 16 on the shaft 13. The mechanism which controls the pawl consists of an arm 30, (see Fig. 4,) pivoted upon the axial shaft 13, and which, extending radially to the circumference of the ratchet-wheel 16 thereon, terminates in a segmental controlling-plate 31, describing an arc corresponding with the periphery of the

wheel. This segmental controlling-plate is carried under the pawl 18, which engages the ratchet, the pawl being made so much wider than the ratchet as to overlap the controlling-plate and rest thereon. When the pawl rests upon the controlling-plate, it is prevented from reaching and engaging the ratchet, and hence, by adjusting the position of the controlling-plate with reference to the stroke of the pawl, the latter may be either held up out of engagement with the ratchet during the whole or a portion of its stroke or by moving the controlling-plate wholly back the pawl may be allowed to engage the ratchet during its entire stroke. The position of the controlling-plate 31 with reference to the pawl 18 is determined and adjusted by means of a toothed segment 32 (see Fig. 4) on the end of an arm 33, projecting from a hub or collar 34 upon a shaft 35, which is mounted in the frame of the machine parallel with the shafts 5 and 13. This toothed segment engages the counterpart teeth of a segmental rack upon a collar 36, mounted to revolve freely upon the axial shaft 13 of the ratchet-wheel and to which the arm 30 is fixed. A second arm 37 projects radially from the collar 34 and terminates in a finger or pin 38, which rests upon the periphery of a pattern-wheel of drum 39. The two arms 33 and 37, in combination with the interposed collar and the finger 38, serve in effect as a pivoted adjusting-lever, bearing at one end upon the pattern-wheel and carrying at the other the segmental rack 32, and this lever is so adjusted that when the finger 38 bears upon the outer periphery of the pattern-wheel the controlling-plate is thrown back so as to coincide with and cover the entire path of the pawl in its movement, and thereby wholly prevent its engagement with its ratchet-wheel. The surface of the pattern-wheel is, however, indented or pierced with recesses *eee* therein to permit the finger 38 or end of the adjusting-lever to drop more or less toward the axis of the wheel, and as it thus drops inward the segmental rack 32 is so turned thereby as to swing the controlling-plate 31 forward more or less and uncover to a corresponding extent the teeth of the ratchet, and to that extent permit the pawl to move the ratchet-wheel. The movement of the ratchet-wheel 16, and consequently the extent of the movement in one direction of the carriage under the needles, is thus determined by the depth of the recesses *eee*, formed in the periphery of the pattern-wheel 39, brought under the adjusting-lever. Thus by providing a controlling-plate, an adjusting-lever, and a pattern-wheel for each of the four ratchet-wheels 14, 15, 16, and 17 the four movements of the cloth-carriage are independently controlled in accordance with the order of arrangement and depth of the several recesses *eee* upon the peripheries of the pattern-wheel.

The pattern-wheels 39 are all fixed upon a shaft 45, mounted to rotate in suitable bear-

ings in the end brackets 6 6, parallel with and below the shafts 5 and 13. They may be made of a diameter large enough to permit of the formation of a succession of holes or recesses 5 or of corresponding blank spaces, which shall equal in number the number of stitches to be made in quilting a length of fabric equivalent to the length of the row of needles, so that in one revolution of the pattern-wheel 10 the whole of the pattern designed for so much of the cloth may be worked out; or, as illustrated in the drawings, the series of successive recesses *e e e* and intervening blank spaces may be arranged in spiral lines upon 15 the periphery of a wide wheel or drum, which shall be moved gradually forward along its axis as it revolves, so as to keep the series of recesses in line beneath the finger end 38 of the adjusting-lever. In either case the wheel 20 is made to revolve so as to bring the several recesses or depressions and the intervening blanks successively under the finger at each stroke of the needle-bar.

The revolution of the pattern-wheel is preferably produced by a pawl 40 (see Fig. 4) 25 upon an oscillating arm 41, coupled by a connecting-rod S to an eccentric 42, either on the main shaft 25 or on an auxiliary parallel shaft 43 geared thereto, (see Figs. 2 and 4,) said 30 pawl being made to engage a ratchet-wheel 44, secured to the shaft 45, upon which the pattern-wheels 39 are all mounted. The pattern-wheels are thus made to rotate one step at each stroke of the needle-bar, synchronously therewith, each step serving to bring 35 a new surface or operative point, consisting of an elevation or depression, as the case may be, under each of the controlling-fingers 38 38.

The revolution of the pattern-wheels, and 40 consequently any change in the direction of the stitches on the fabric, may be arrested at pleasure by disengaging the pawl 40, and this disengagement is automatically effected, when required, by means of a bent lever 60, 45 pivoted on the shaft 45, and which has one arm extending radially out to swing under the pawl and lift it from the ratchet-teeth, and its other arm, bent at a right angle to the first, coupled by a rod 61 to one arm of a second bent lever 62, pivoted to the frame of the 50 machine, and whose second arm 65, projecting at a right angle with the first beyond its pivotal center, is engaged and tripped by one or more adjustable lugs 63 63, fitted upon a 55 bar 64, attached to the carriage E of the quilting-frame, as shown in Fig. 4. By changing the position of these lugs 63 and varying the length thereof variations may be produced in the quilted design by causing a repetition of 60 any particular feature of the pattern, said repetition being more or less extended according to the interval during which the pattern-wheel is held stationary, as determined by the length of the tripping-lug 63, which 65 may be moving at the time over the arm 65. So soon as each pawl 18, governed by a controlling-plate, has completed its forward

stroke and simultaneously with its return the finger 38, actuating the controlling-plate, is lifted to permit of the movement of the 70 pattern-wheel on which it rests by means of a rock-shaft 47, mounted parallel with the main shaft 25 in the upper part of the brackets 6 6. This rock-shaft is made to oscillate 75 synchronously with the reciprocation of the needle-bar by means of an eccentric 49 on said main shaft 25, coupled to an arm projecting from the rock-shaft, as shown in Figs. 2 and 4, and each adjusting-lever or finger-arm 37 is coupled by a pivoted rod 48 to a 80 second arm 46 on the same rock-shaft 47. (See Fig. 4.) Each movement of the rock-shaft will thus operate to lift the adjusting-lever or finger-arm 37 far enough to disengage the finger 38 thereon from the pattern- 85 wheel. The engagement of the adjusting-fingers with the surface of the pattern-wheels is insured by means of springs 51 51, attached to the arms carrying or controlling said fingers. 90

Although the pattern-wheels are preferably moved intermittently, as described, in order to avoid lengthening out the pattern thereon, it is evident that this is not essential, but that 95 by lengthening more or less the spaces between the operative points on the pattern, which govern the action of the adjusting-lever and determine the position of the controlling-plate at the moment the pawl is moving, the pattern-wheels and pattern may be 100 made to move continuously forward under the end of the adjusting-levers or the fingers carried thereby. It is also evident that the adjusting-fingers or contact ends 38 of the adjusting-levers need not necessarily drop 105 into holes out of which they must needs be lifted positively between each stroke of the pawl by means of the oscillation of a rock-shaft 47 in manner as described, but that by lengthening or increasing the spaces between 110 the operative points on the pattern-wheel and imparting the proper form or inclination thereto the fingers or ends of the levers will, in sliding over said spaces, be automatically actuated as required. 115

An overrunning of the pattern-wheels is prevented at the end of each successive step in their intermittent revolution, and positive accuracy in the register of the finger ends of the adjusting-levers with the patterns on said 120 wheels is secured by means of a lock-tooth 53 upon the end of one arm of a pivoted lever 54, whose opposite arm is made to bear upon a cam-wheel 55 on the main shaft 25, said cam-wheel being so formed and adjusted 125 that at the moment in each revolution of the main shaft at which the forward stroke of the pawl 40, actuated thereby and by which the shaft 45, carrying the pattern-wheels, is rotated, terminates said angular lock-tooth 53 130 will be forced into a counterpart angular notch in a notched wheel 56, mounted on said shaft 45, as shown in Fig. 4, and will remain there until the actuating-pawl 40 has been

drawn back and is in readiness to begin another forward stroke, whereupon it will be automatically withdrawn by a spring or by the overbalancing-weight of the upper arm of the lever.

When the pattern card or motive is arranged upon the wheels 39 39 in lines encircling the wheels spirally, as is illustrated in Figs. 1 and 2, so that a lateral movement of the wheels in the direction of the axis thereof is required to keep the patterns in register with the tracing-fingers 38 of the adjusting-levers, this longitudinal movement is produced by so mounting the shaft 45, carrying said wheels, as to allow it to have longitudinal play in its bearings, and by forming a spiral groove 52 upon said shaft (see Figs. 1 and 2) to be engaged by a fixed finger 57, so that as the shaft is intermittently rotated in one direction, in manner as described, it shall be simultaneously moved longitudinally in agreement with the pitch of the spiral line described by the pattern. A reverse movement of the shaft 45 is prevented by means of a pawl 50, (see Fig. 4,) adapted to engage the teeth of the ratchet-wheel 44 upon said shaft. The automatic return of the shaft to its position when the end of the pattern is reached may be effected by means of a weight 58, which, as the shaft is rotated forward, is wound up upon a drum 59, fixed on the shaft at any convenient point of its length, and which, whenever the retaining-pawl 50 and the actuating-pawl 40 are lifted and disengaged, will operate to rotate the shaft in the opposite direction. Where a weight is not employed, the return of the shaft may be produced by means of a crank 70 at one end of the shaft 45. By coupling said crank by means of a detachable pin 71 with the arm 60 of the disengaging-lever the crank may be used to disengage the actuating-pawl 40 by hand to produce at any time a repetition of any particular feature of the pattern.

It is evident that any irregular surface made to move in synchronism with the needle-bar may be substituted as an equivalent for a series of depressions and elevations produced on the periphery of a revolving wheel to elevate or depress the end of an adjusting-lever, and thereby oscillate an arm 33, by which to govern the position of the guard or controlling-plate 31, which determines the duration of the engagement of the actuating-pawl 18 with the ratchet-wheel 16, by whose intermittent movement the quilting-frame is made to travel under the needle. Such an equivalent device is illustrated in Figs. 5 and 6 of the drawings. In said figures an endless chain or belt 80, bearing upon its surface a series of blocks 82 82 of various heights to meet the exigencies of the pattern to be worked, is made to revolve upon suitable drums or pulleys 83 83, under the four fingers or pattern ends 38 of the adjusting-levers of the machine, so that each finger shall be lifted more or less from its normal or zero position, and thereby

move the guard-plate 30, actuated thereby, more or less over the teeth of its appropriate ratchet-wheel 16, 17, 14, or 15, as and for the purpose hereinbefore fully described. The drums or pulleys over which the endless pattern chain or belt 80 is carried may be made to revolve in synchronism with the movements of the needle-bar, either continuously by means of suitable gearing from the main shaft or intermittently by means of a worm-wheel 81, gearing with a worm 85 upon a shaft carrying a ratchet-wheel 84, similar to the ratchet-wheel 44, and which is arranged to be actuated by a swinging pawl 40 upon an oscillating arm 41, actuated from the main driving-shaft in like manner as has hereinbefore been described.

It will be seen that in the operation of the machine constructed substantially as described the continuous rotation of the master-shaft is made to produce the reciprocating movements of the needle-bar in the customary manner, and also to produce simultaneously and in unison with the movements of said needle-bar a regular oscillation of the four pawls, which are adapted to severally engage the opposed or reversed ratchet-wheels, fixed upon the two shafts by which the four-way feed mechanism of the machine is actuated, the engagement of each pawl with its appropriate ratchet-wheel required to turn either feed-shaft in either direction being permitted or prevented, and the length of movement thereof controlled by means of the controlling-plates adapted to move in between the several pawls and ratchets, and whose position is determined and varied by the movements of the levers actuated by the variations of surface in the several patterns with which they are brought in contact and which are geared to the master-shaft so as to be moved in synchronism with the movements of the needle-bar. The four movements of the feed—back or forth and in directions at right angles to each other—are thus severally controlled, arrested, or reversed by a control of the several pawls which actuate the feed in said four directions, said control being automatically directed and adjusted by means of patterns having an irregular surface and which are made to move in contact with levers connected with said pawls in synchronism with the movements of the needle-bar.

I claim as my invention—

1. The combination, in a quilting-machine, of the master-shaft, the stitch-forming mechanism actuated by said shaft, the double-acting feed-carriage having sections which move simultaneously in two directions on lines at right angles to each other to constitute a four-way-feed, two pairs of feed-actuating ratchet-wheels severally geared mediately to the two sections of the feed mechanism to move the same, swinging pawls engaging each pair of ratchet-wheels to move them intermittently in opposite directions and which are mediately geared to the master-shaft to be

actuated by its rotation in synchronism with the reciprocating movements of the needles, controlling-plates moving between the pawls and ratchets and which prevent or permit to a greater or less extent the engagement of the moving pawls with said feed-actuating ratchets, and patterns of variable surface, as described, which govern the movement and position of said controlling-plates, all substantially in the manner and for the purpose herein set forth.

2. The combination, with the stitch-forming mechanism in a quilting-machine, of a quilting-frame, a double carriage operating to change by its movements the relative position of the stitching mechanism and quilting-frame, a rack-bar attached to one section of the carriage, a rotating shaft mounted in stationary bearings over the rack-bar at a right angle thereto, a pinion feathered upon said shaft to rotate therewith and move longitudinally thereon and engage the rack-bar, a ratchet-wheel actuating said shaft, a vibrating pawl engaging said ratchet, a controlling-plate adapted to move between the pawl and ratchet, a lever adapted to move said plate, a movable pattern, substantially as described, upon which one end of the lever bears to be oscillated thereby, and a master-shaft to which the pawl and the needle-bar are mediately geared, substantially in the manner and for the purpose herein set forth.

3. The combination, in a quilting-machine, with its reciprocating needle-bar, the mechanism for actuating the same, and the master-shaft operating said mechanism, of a carriage mounted to traverse beneath the needles, a frame mounted on the carriage to traverse under the needles at a right angle with the movement of the carriage, an endless intermittently-rotating screw geared mediately to the master-shaft and engaging a nut fixed to the carriage, an intermittently-rotating shaft also geared mediately to said master-shaft and mounted parallel with the screw, a pinion feathered upon said shaft to rotate therewith and slide longitudinally thereon, and a rack upon the movable frame engaged by the pinion, all substantially in the manner and for the purpose herein set forth.

4. The combination, with the stitch-forming mechanism in a quilting-machine and with master-shaft actuating the same, of a double carriage in two sections, each having a reciprocating movement upon lines at a right angle to the other, two rotating shafts geared, respectively, with the two sections of said carriage and adapted thereby to move said sections independently upon lines at right angles to each other, a pair of opposed ratchet-wheels fixed upon each shaft and severally adapted to rotate it in opposite directions, pawls swinging upon each shaft and adapted each to engage and actuate one of said ratchet-wheels, controlling-plates which move between each of said pawls and its appropriate

ratchet to control its engagement therewith, an oscillating shaft mounted parallel with the axial shafts of the ratchet-wheels and geared to the master-shaft, radial arms projecting from said oscillating shaft and coupled to the swinging pawls to produce a uniform reciprocation thereof in synchronism with the reciprocating movement of the needle-bar, a series of patterns presenting in systematic order a series of elevations or depressions and which are geared to the master-shaft to be moved thereby intermittently, step by step, in synchronism with the movements of the stitch-forming mechanism, and pivoted controlling-levers actuated by contact with the several patterns and connected each to one of the pawl-controlling plates, so that the play of the lever produced by the movement of the irregular surface of the pattern under it will operate to move the controlling-plate to and fro under its appropriate pawl, all substantially in the manner and for the purpose herein set forth.

5. The combination, in a quilting-machine, with its stitch-forming and cloth-supporting devices, of a rotating shaft operating, substantially in manner as described, to change the relative position of the two devices at each stroke of the needle-bar by means of a ratchet-wheel actuating said rotating shaft, a reciprocating pawl actuating said ratchet, a master-shaft to which the stitch-forming devices and the reciprocating pawl are mediately geared to move in synchronism, a lever adapted to control the engagement of the pawl with the ratchet, a pattern-wheel having a systematic series of indentations formed about its periphery, a finger attached to the pawl-controlling lever to enter the indentations in the wheel, a ratchet-wheel attached to the pattern-wheel to move with it, a pawl actuating said ratchet-wheel, an eccentric upon the master-shaft actuating the pawl in unison with each stroke of the needle-bar, a rock-shaft geared to the master-shaft to oscillate at each vibration thereof in unison with the reciprocation of the needle-bar, an arm projecting from the rock-shaft, and a coupling-rod connecting said arm with the guard and operating by its movements to lift the finger clear of the pattern-wheel at each movement of the latter, substantially in the manner and for the purpose herein set forth.

6. The combination, in a quilting-machine, with its needle-bar and the master-shaft actuating said needle-bar, of a pattern-wheel having its peripheral surface systematically indented in a continuous line encircling the same spirally and mounted upon an axial shaft which has longitudinal play in its bearings, a screw upon said shaft the pitch of whose spiral grooves correspond with that of the spiral line of indentations of the wheel, a stationary finger entering the groove of the screw, a ratchet-wheel secured to the shaft, a pawl actuating said ratchet-wheel, and an eccentric upon the master-shaft of the machine

actuating said pawl in unison with the reciprocating movement of the needle-bar, all substantially in the manner and for the purpose herein set forth.

5 7. The combination, with the stitch-forming and feed mechanism of a quilting-machine, of a rotating shaft actuating, substantially in manner as described, the feed mechanism, a pair of reversed ratchet-wheels on
10 said shaft, pawls actuating said wheels from opposite directions and having the means described for moving the same in synchronism with the stitch-forming mechanism, a controlling-plate which moves between each pawl
15 and its ratchet, a movable pattern, substantially as described, mediatey geared to the stitch-forming mechanism, and a lever actuated by contact with the pattern and geared to the pawl-controlling plate, substantially in
20 the manner and for the purpose herein set forth.

8. The combination, with the stitch-forming and feed mechanism of a quilting-machine, of a rotating shaft actuating, substantially in manner as described, the feed mechanism, a pair of reversed ratchet-wheels on
25 said shaft, pawls actuating said wheels from opposite directions and having the means de-

scribed for moving the same in synchronism with the stitch-forming mechanism, a controlling-plate which moves between each pawl
30 and its ratchet, a pattern-wheel, substantially as described, a ratchet-wheel actuating said pattern-wheel, an oscillating pawl engaging said ratchet-wheel and mediatey geared to
35 the stitch-forming mechanism, a controlling-lever pivoted upon the axis of the ratchet-wheel and whose outer end is made to pass between the pawl and ratchet to prevent their
40 engagement, an actuating-lever pivoted upon the frame of the machine and coupled to the controlling-lever to move it, and one or more lugs carried by the carriage and which move
45 the actuating-lever by contact therewith, and thereby disengage the pawl and arrest the movement of the pattern-wheel, all substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM KOCH.

Witnesses

A. N. JESBERA,
E. M. WATSON.