(No Model.) 3 Sheets—Sheet 1.

W. KOCH.

QUILTING MACHINE.

No. 381,798. Patented Apr. 24, 1888.

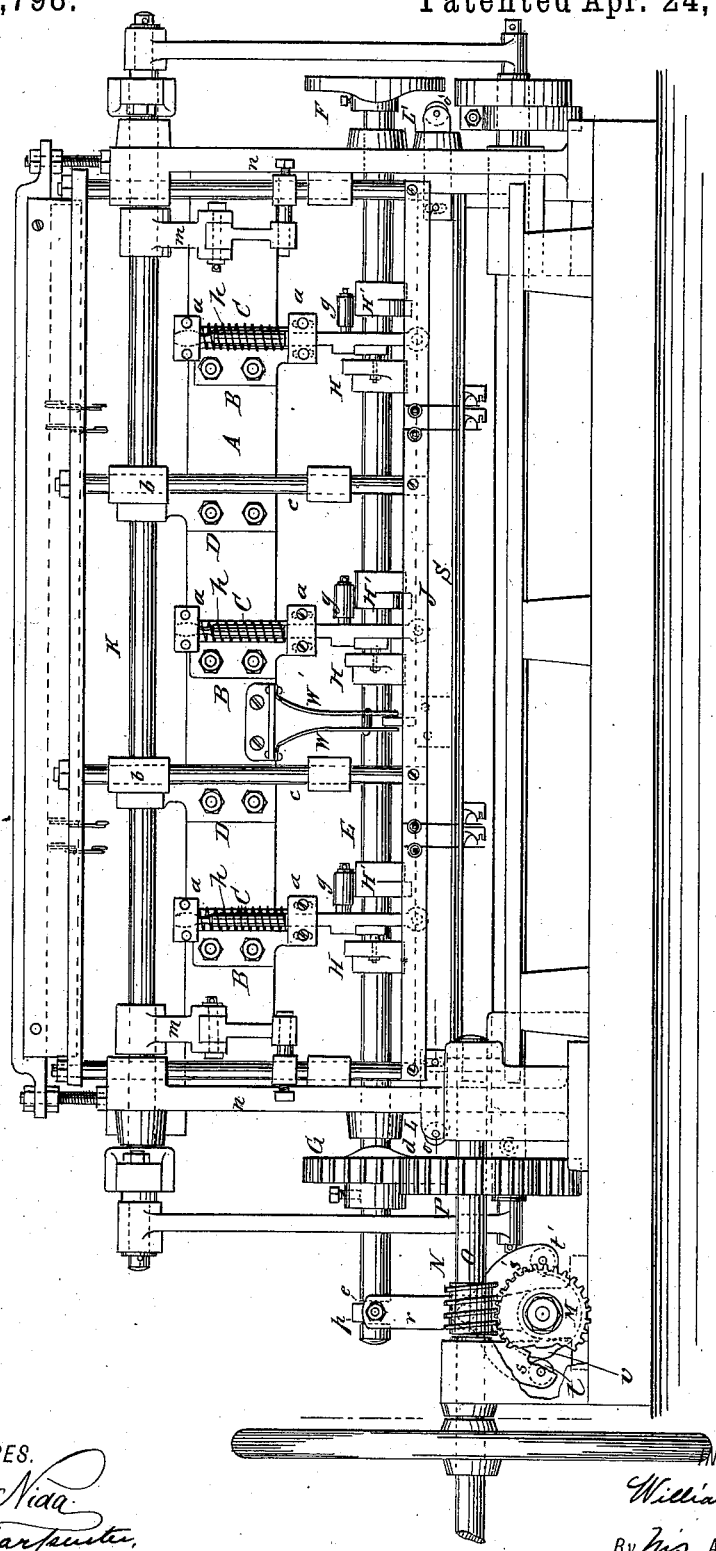

Fig. 1.

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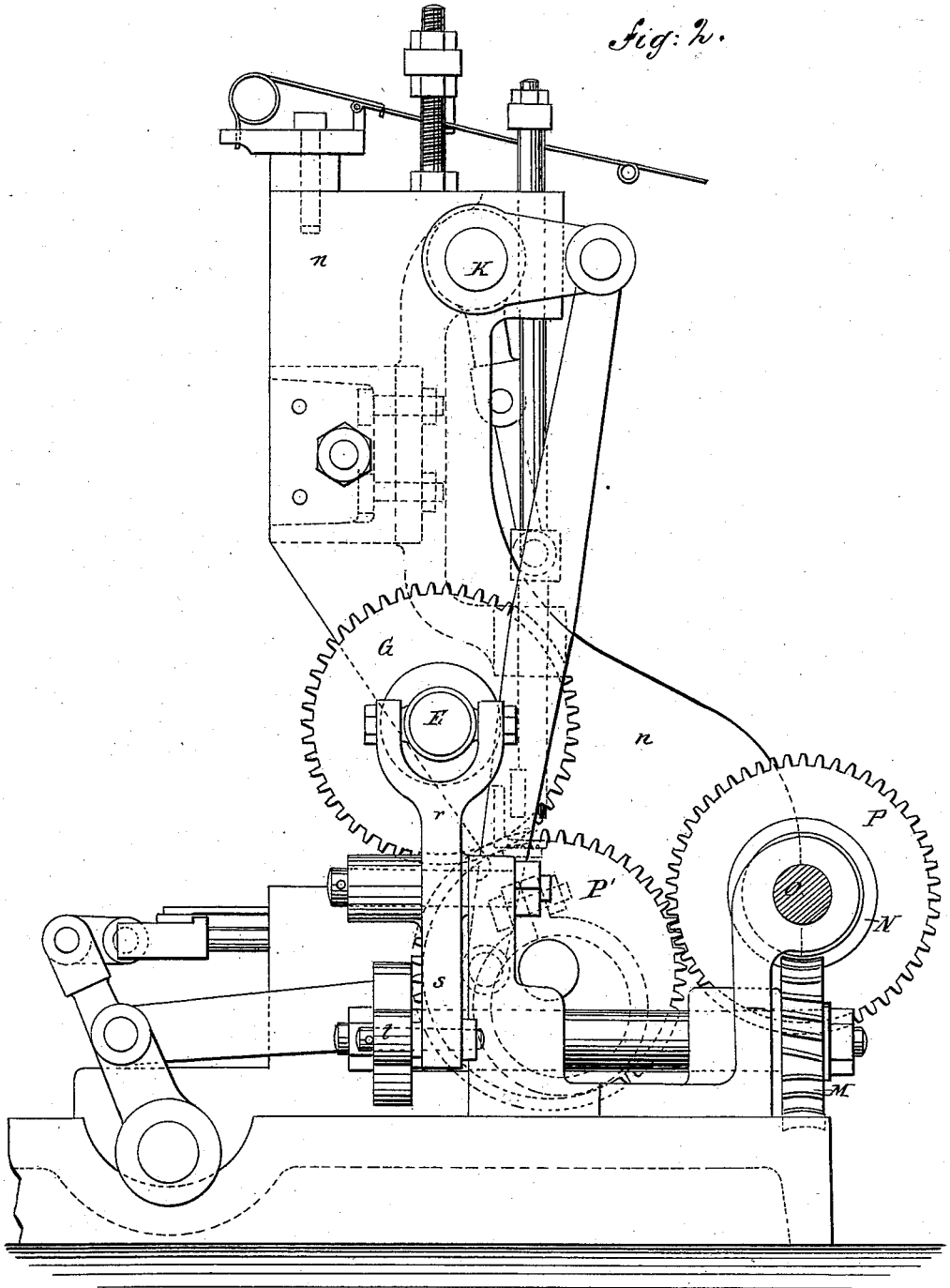
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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QUILTING MACHINE.

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Fig: 4.

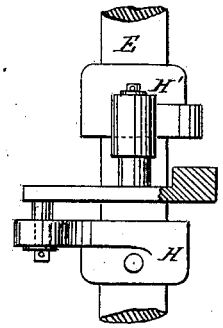


Fig: 3.

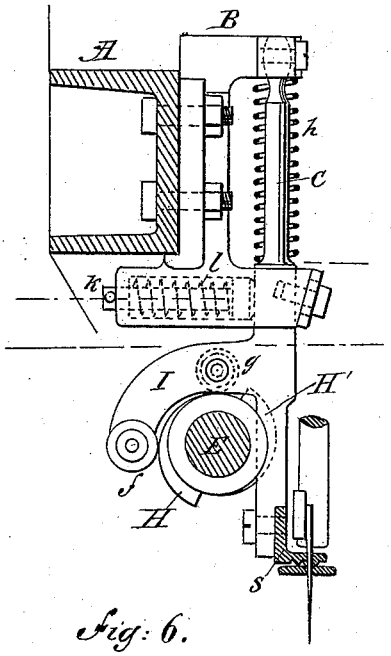


Fig: 6.

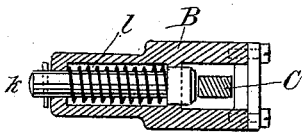


Fig: 7.

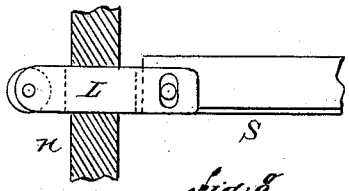


Fig: 8.

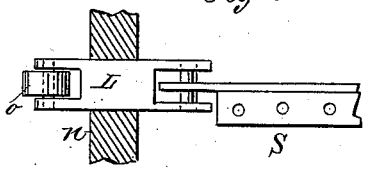
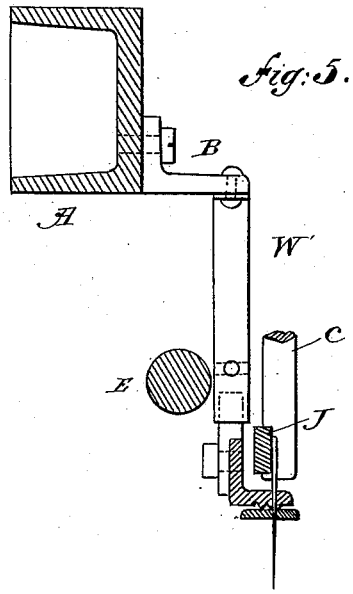


Fig: 5.



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Edmund Thompson.

UNITED STATES PATENT OFFICE.

WILLIAM KOCH, OF NEW YORK, N. Y.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 381,798, dated April 24, 1888.

Application filed December 15, 1885. Serial No. 185,693. (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 a certain new and useful Improvement in Quilting-Machines; and I declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention is in the nature of an improvement in quilting-machines, and the invention consists in a quilting-machine arranged, constructed; and combined for the purpose and in the manner hereinafter particularly shown, described, and claimed.

In the accompanying sheets of drawings, Figure 1 is a side elevation of my quilting-machine; Fig. 2, an end view of same. Fig. 3 is a detail, partly in section, showing feed-bar, operating-cams, and springs; Fig. 4, a detail section of feed-shaft and cams; Fig. 5, part section showing restoring-spring to regulate the horizontal motion of the feed-bar; Fig. 6, a cross-section showing horizontal spring for feed-bar guide-bars and adjusting devices for the same; Fig. 7, a side view, partly in section, of bar and roller for side feed; Fig. 8, a plan view of the same.

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

This invention relates to quilting-machines which are provided with a series of needles arranged in rows on one or more needle-bars; and the improvement relates to the feeding mechanism of such a machine. In the ordinary quilting-machine this feeding mechanism consists of a series of rollers which carry the fabric in one direction beneath the needles, and a reciprocating carriage, which moves the goods at right angles to the direction given them by the feed-rollers, the feed-rollers being journaled to the reciprocating carriage and traveling with it. To improve, simplify, and render less expensive the feeding devices, but above all to render the feed easily adjustable and capable of producing an increased or greater number or variety of quilting designs on the fabrics subjected to the action of the machine than can be produced by machines with the old form of feed, I construct my quilting-machine of any suitable size and supported by any suitable frame with a supporting-bar, A, which is bolted to the frame-work of the machine, and which has bolted to it brackets B, which form guides *a* for a series of feed-bar guide-bars, C, and to this bar A are also bolted brackets D, which form guides *b* for vertical guide-bars *c*. Extending across the width of the machine, and journaled in suitable bearings on the frame of the same, is a shaft, E, which, for convenience of reference, I shall designate a "feed-shaft." To one end of this shaft is fixed a cam-wheel, F, and also to it is keyed a gear-wheel, G, onto which gear-wheel is formed a cam, *d*, and also in the shaft E, and near one of its ends, is turned a groove, *e*, and onto the shaft E are keyed cams H H′ on either side of the guide-bars C. These cams have the form and arrangement shown in Fig. 3 of the drawings, and in contact with the cams H are curved projections I, which are fixed to and extend rearward from the guide-bars C; or, to be more definite, the cams H are in contact with rollers *f*, journaled to the lower ends of the projections I, and the cams H′ are in contact with rollers *g*, fixed to and projecting at right angles from the guide-bars C, as is shown in Fig. 1. Surrounding the upper parts or stems of the guide-bars C are coiled springs *h*, and received within recesses in projections of the brackets B are pistons *k*, the inner ends of which abut against the rear sides or parts of the guide-bars C. These pistons *k* are surrounded by coil-springs *l* all of which is clearly shown in Figs. 3 and 6 of the drawings. The upper ends of the guide-bars C, which are received by the guides *a*, are made substantially in the form of prolate spheroids, and at the points where the pistons *k* abut against the bars small spaces are left on both sides of each bar between it and the walls of the recess in the bracket, through which it passes, as shown in Fig. 6, while the lower ends of the bars are pivoted or secured by some equivalent means to the feed-bar S.

J represents the needle-bar of my machine. This needle-bar is supported by the guide-rods *c*, and it is operated by the links and arms *m*, fixed to the rock-shaft K in the ordinary manner. Fitted in suitable slideways or slots formed in the side framing, *n*, of my machine are studs L. The inner ends of these studs are, by slots and pins, as is shown in Figs. 7 and 8, fixed at or near the ends to the feed-bar

S, which is fixed to the lower ends of the bars C. The outer ends of these studs are fitted with rollers *o*. Encircling the grooved recess *e* of the feed-shaft E is a collar, *p*, and this collar is secured to a pivoted lever, *r*, the lower end of which arm is branched or of yoke form, as at *s* and *s'*, these branches having journaled to them rollers *t* and *t'*, and these rollers rest alternately on a cam, *v*, to which cam a revolving motion is imparted by a gear-wheel, M, the teeth of which are actuated by a worm, N, keyed to the driving-shaft O; also, to this driving-shaft is keyed or secured a gear-wheel, P, which is connected with the gear-wheel G, before mentioned, by an intermediate gear-wheel, P', as shown in Fig. 2.

Now, it being understood that the quilting-machine when it is constructed substantially as I have hereinbefore described, and is fitted with the usual shuttles and shuttle mechanism or thread-looping devices, (which, however, my present invention does not concern,) its operation is as follows: Power being applied to the driving-shaft O, that shaft is caused to revolve, and in turn the gear-wheel P revolves and through it and the intermediate gear-wheel, P', the gear-wheel G, so that a revolving motion is imparted to the shaft E, to which this last-named gear-wheel is keyed, as before stated. Now, as this shaft E revolves, the cam H, operating against the roller *f* of the projections I, forces backward the feed-bar guide-bars C, and when this cam H has ceased so to act the shaft E, still revolving, brings the cams H' in contact with the rollers *g*, and by that action pushes or lifts the bars C; and by this last-named action of the cam H' the feed-bar S, fixed to the lower ends of the guide-bars C, is raised from the surface of the fabric which is being quilted, and at that instant the pistons *k*, actuated by the coil-springs *l*, restore the bars C to the perpendicular position from which they were forced by the action of the cams H, as before described, and when this perpendicular position is recovered by the bars C then the coiled springs *h* force downward the bars C until the feed-bar S is again in contact with the fabric beneath it, the cams H and H' being so constructed and arranged as to permit the action of the springs *h* and *l*, as stated. Now, besides the revolving motion of the shaft E, it has also a horizontal sliding motion in the direction of the width of the machine, and this horizontal motion is produced by the action of the worm N on the wheel M, causing the cam *v*, which is fixed to the same shaft as the wheel M, to revolve, and as this cam is revolved it is brought alternately against the rollers *t* and *t'* of the yoke *s s'*, so that a vibratory motion is imparted to the lever *r* about its fulcrum, and that motion is imparted to the shaft E, causing that shaft to slide horizontally without breaking the connection between the gear-wheels by which it is revolved, so that the shaft revolves while it slides or reciprocates, and while this shaft revolves the cam *d* on the wheel G is brought in contact with the roller *o* of the stud L, and by this contact forces horizontally the feed-bar S to the extent of the throw of the cam *d*, this motion of the feed-bar being permitted through its pivoted attachment to the guide-bars C and the character of their connection with the guides *a*, and when the stud L ceases to be acted upon by the cam *d*, then a spring, W', fixed to the bar A, restores the feed-bar S to its normal position, to be again acted on by the cam *d*, and in like manner the feed-bar S is forced horizontally in an opposite direction by the cam F, which is brought in contact with the roller *o'*, fixed to the stud L', and when the action of this last-named cam has ceased the feed-bar S is restored to its normal position by the spring W', so that the feed-bar S is alternately moved horizontally across the width of the fabric by the slight horizontal or reciprocating motion of the shaft E, as described.

Now the result produced by the construction, combination, and arrangement of the several elements of my quilting-machine is this: The fabric to be quilted is placed on the ordinary cloth-plate of the machine beneath the needles on the needle-bar J. The driving-shaft O, imparting motion to the gear-wheels and other intermediate mechanism common in quilting-machines, causes the needle-bar J to have a vertical reciprocating motion, and at the same time the shaft E, revolving and reciprocating horizontally, as described, causes the cams H H' to be brought alternately in contact with the rollers *f* and *g*, so that the feed-bar S is alternately thrust backward and lifted vertically by the action of these cams and restored to its normal position by the action of the piston *k* and springs *h* and *l*, and in the interval at which the cams H are out of contact with the rollers *f* the slight horizontal reciprocation of the shaft E and its cams *d* and F brings these cams in contact with the rollers *o o'* of the studs L L', the combination of these several motions producing in the feed-bar S a reciprocating horizontal motion across the width of the machine, a reciprocating back and forward movement, and a reciprocating vertical or up and down movement, while at the same time and independently the needles are moving up and down. Now, since the lower face of the feed-bar S is provided with small teeth, as shown in Figs. 3 and 5, and these teeth rest with a yielding pressure on the surface of the fabric that is being quilted from time to time by the action of the spring *h*, it will be seen that while the feed-bar is in contact with the fabric the fabric is compelled to follow the sidewise and backward motion of the feed-bar, and since the position of the surface of the fabric is being constantly changed by these movements to the action of the needles, as is obvious, the stitching that is formed in the fabric will correspond or take form accordingly, and so produce diamond or other shaped figures. Of course the size and the form of these figures produced by the needles can be varied by va-

rying the throw of the cams *d* and F and the cams H and H′, or by substituting cams of different forms.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a quilting-machine, the combination, with a feed-bar, of a shaft which reciprocates longitudinally in its bearings, and which is provided with cams that act upon the feed-bar and impart to it a longitudinal reciprocating motion, as and for the purpose described.

2. In a quilting-machine, the combination, with a feed-bar, of a shaft which revolves and reciprocates longitudinally, and which is provided with systems of cams that act upon the feed-bar through suitable bearings and impart to it regular reciprocating movements in a longitudinal, a transverse, and a vertical direction, as and for the purpose described.

3. In a quilting-machine, the combination, with a feed-bar having a series of guide-bars attached thereto, of a shaft which revolves and reciprocates longitudinally, and which is provided with systems of cams that act upon bearings connected with said guide bars and feed-bar, and impart to the feed-bar regular reciprocating movements in a longitudinal, a transverse, and a vertical direction, as and for the purpose described.

4. In a quilting-machine, in combination, a revolving and reciprocating shaft provided with cams, a feed-bar having a longitudinal reciprocating motion imparted to it by said cams, and springs for regulating said motion of the feed-bar, as and for the purpose described.

5. In a quilting-machine, the following combination of parts: a feed-bar, a series of guide-bars attached thereto, which pass through suitable guideways, and are provided with projections I, and bearing-rollers *f* and *g*, a series of cams, H, which act on the rollers *f*, a series of cams, H′, which act on the rollers *g*, springs *h*, and pistons *k*, with springs *l*, all arranged to operate in the manner and for the purpose described.

6. In a quilting-machine with a series of needles, the combination of a supporting-bar, A, extending across the width of the machine and provided with suitable guideways, a series of feed-bar guide-bars, C, fitted into said guideways, a feed-bar, S, needle-bar J, revolving and reciprocating shaft E, gear-wheel G, with cam *d*, fixed thereto, gear-wheel P, driving-shaft O, worm N, gear-wheel M, cam *v*, yoke-arms *s s′*, lever *r*, and cam-wheel F, all constructed, arranged, and combined in the manner and for the purpose described.

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In presence of—
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D. A. CARPENTER.