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D. H. COLES.

QUILTING MACHINE.

No. 340,863. Patented Apr. 27, 1886.

Fig. 1.

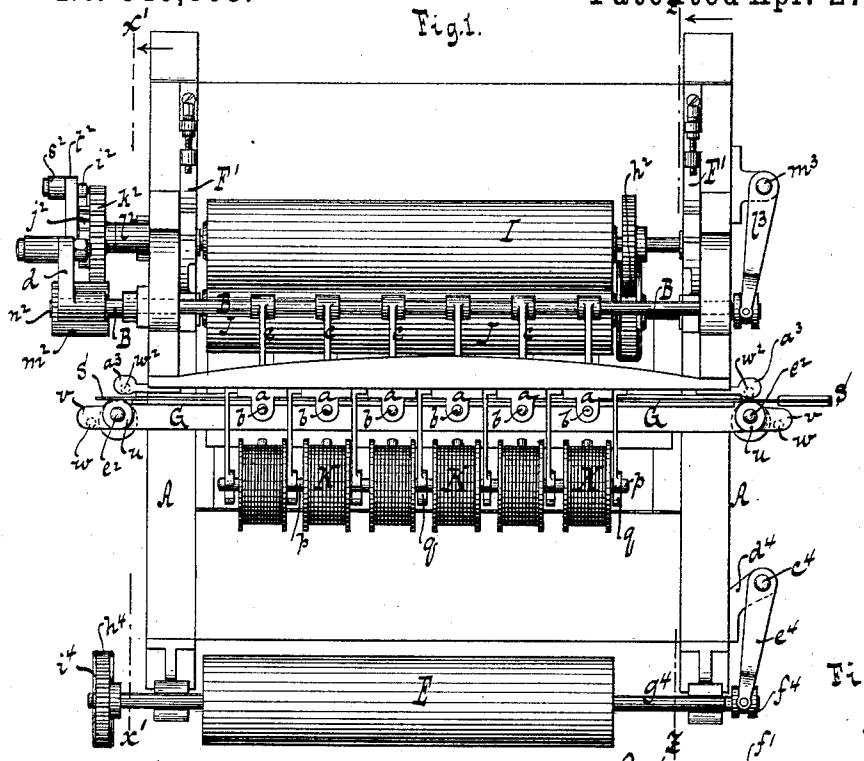
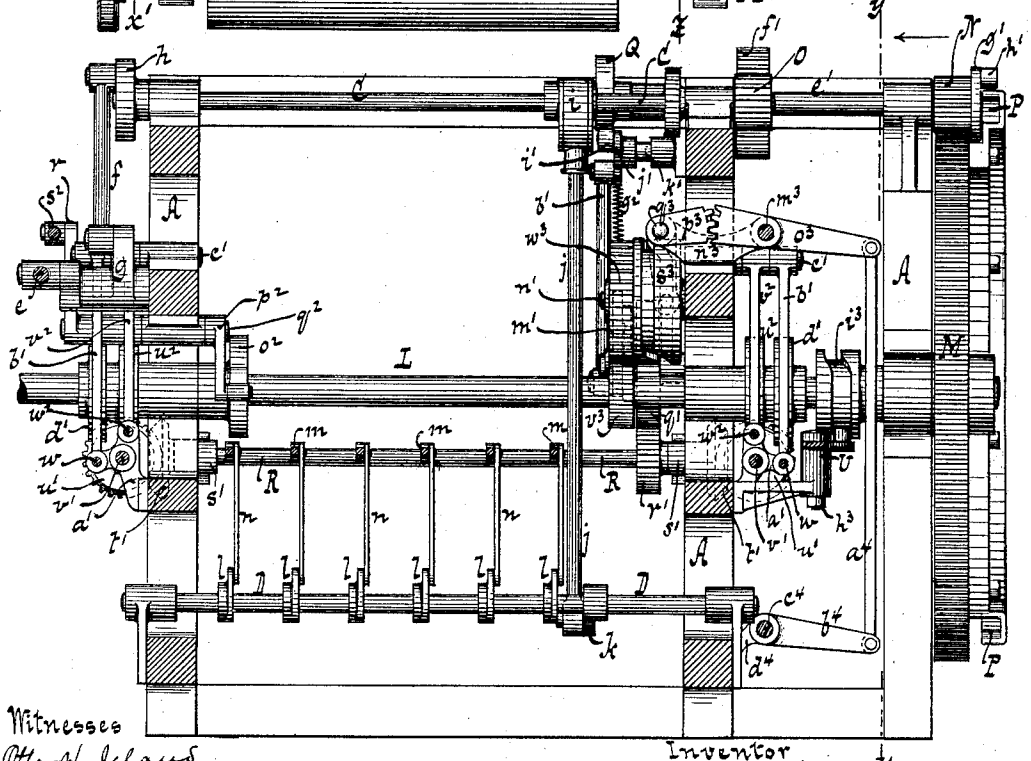


Fig. 2.



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QUILTING MACHINE.

No. 340,863. Patented Apr. 27, 1886.

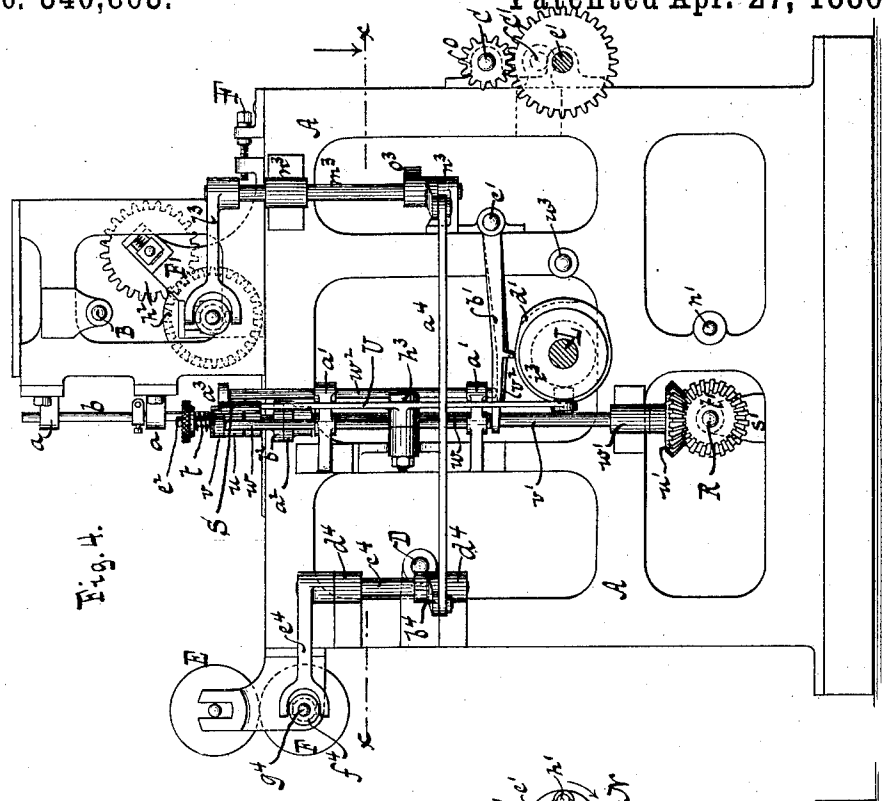

Fig. 4.

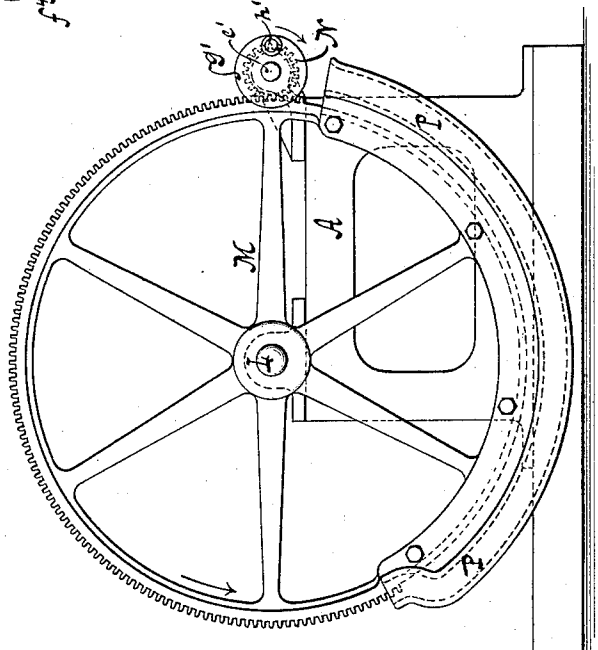

Fig. 3.

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QUILTING MACHINE.

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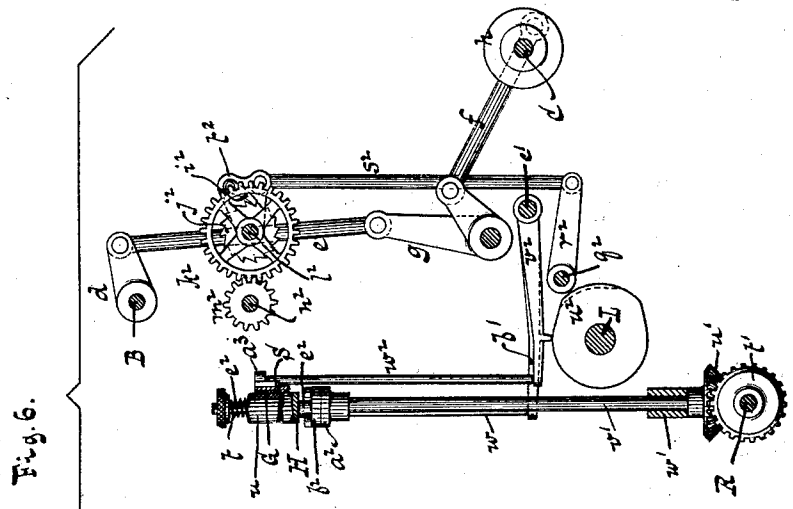
Fig. 6.



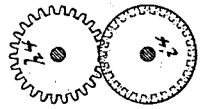
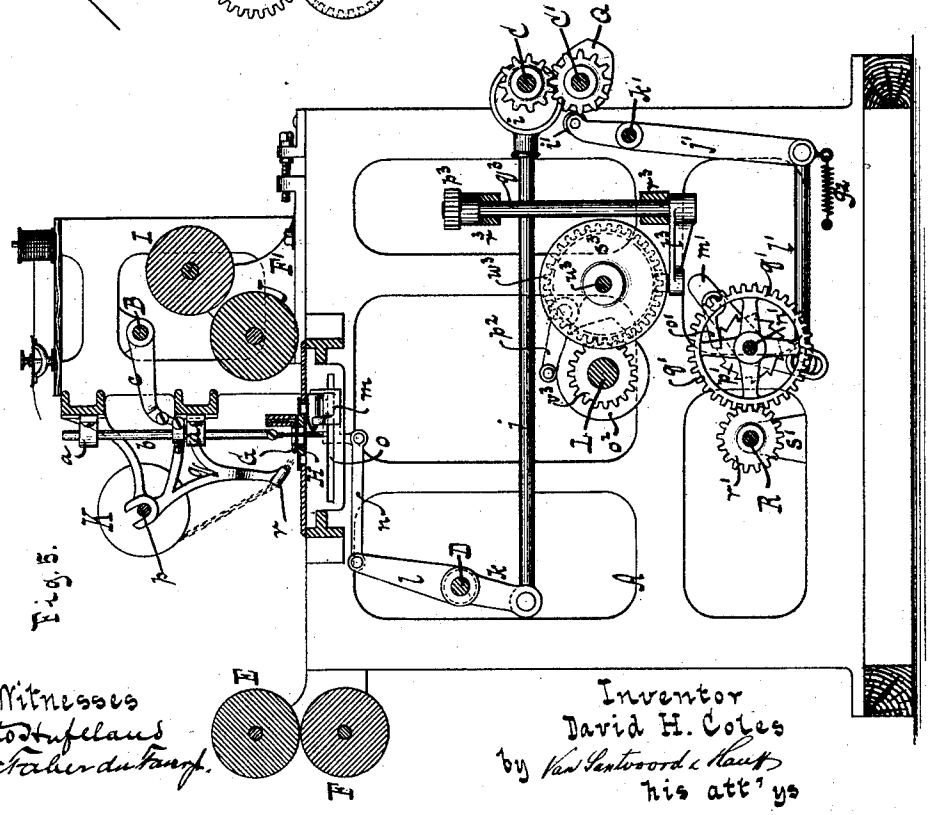


Fig. 5.



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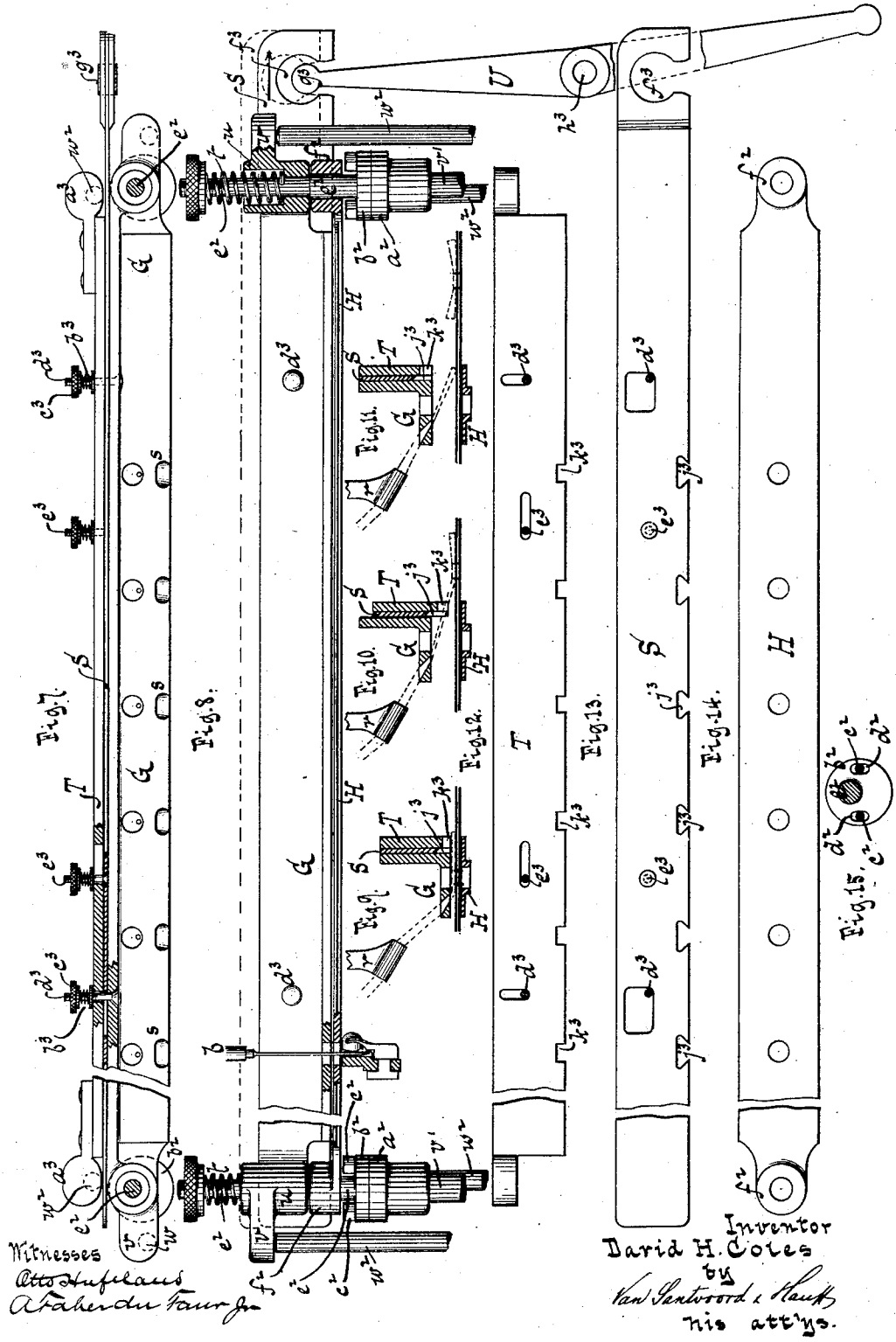
QUILTING MACHINE.

No. 340,863. Patented Apr. 27, 1886.



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QUILTING MACHINE.

No. 340,863. Patented Apr. 27, 1886.

Fig. 16.

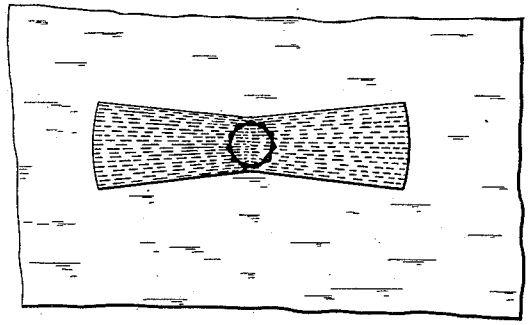


Fig. 17.

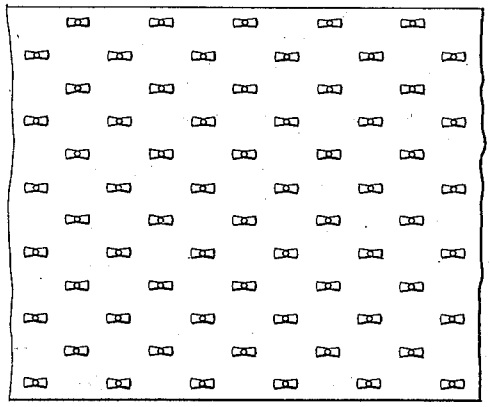
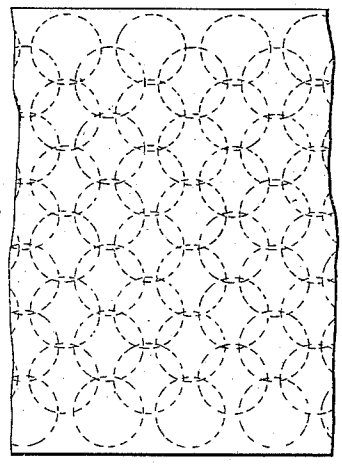


Fig. 18.



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UNITED STATES PATENT OFFICE.

DAVID H. COLES, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, A. G. DARWIN, OF GLEN RIDGE, AND JAMES C. BEACH, OF BLOOMFIELD, N. J.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 340,863, dated April 27, 1886.

Application filed October 29, 1885. Serial No. 181,286. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. COLES, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Quilting-Machines, of which the following is a specification.

My invention relates to improvements in quilting-machines; and it consists in certain novel features of construction, which are fully pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 is a plan or top view, the parts to the right of the vertical shafts m^3 and c^4 being omitted. Fig. 2 is a horizontal section in the plane *x x*, Fig. 4. Fig. 3 is an end view. Fig. 4 is vertical section in the plane *y y*, Fig. 2. Fig. 5 is a vertical section in the plane *z z*, Fig. 1, the rollers E F and I J being shown in section. Fig. 6 is a vertical section in the plane *x' x'*, Fig. 1. Figs. 7 to 18 are details, which will be described as the specification progresses.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the frame, and to it are secured the guides *a*, for the needle-bars *b*, to which the necessary up-and-down motion is communicated by the arms *c*, mounted on a shaft, B, running through the whole length of the machine and having its bearings in the frame A. On one end of this shaft is secured an arm, *d*, Figs. 1 and 6, which is connected by rods *e f* and bell-crank lever *g* with an eccentric, *h*, mounted on the shaft C, Figs. 2 and 6. This shaft is intermittently rotated, as will hereinafter be described. The shaft C also carries an eccentric, *i*, Figs. 2 and 5, which is connected by a rod, *j*, with an arm, *k*, secured to the rock-shaft D, on which are mounted a series of arms, *l*, which are connected to the shuttle-carriers *m* by links *n*. When the shaft C is rotated, the desired reciprocating motion is given to the shuttle-carriers, causing them to slide in the guides *o*, Fig. 5, which are secured to the frame A.

I do not desire to confine myself to this construction of needle and shuttle operating devices, as any other suitable devices may be applied, and an intermittent motion be imparted to them.

The machine shown in the drawings contains all the appliances for "tufting," and will turn out "tufted" quilts of the pattern indicated in Fig. 17, in which the tufts are quincuncially placed; but this pattern may be essentially varied by any skilled operator. To produce this pattern it is necessary, first, to introduce the quilting and tufting material under the needle. Second, to give the quilting and tufting material together the necessary feed motion, so that the operation of the sewing device will cause the needle to stitch through both the desired number of times and then stop. This feed motion I term the "primary feed." Third, the whole must then be fed forward to form the desired length of tuft. Fourth, the tuft must then be cut off by the cutting device. Fifth, the quilting material alone must then be fed forward and sideward independent of the stitch-forming mechanism and the primary feed, until the place for a new tuft comes under the needle, when the whole operation is repeated by the continued action of the machine. This operation and the third operation are accomplished by means of the mechanism which I herein refer to as "independent cloth-feed mechanism."

I will now proceed to describe these operations in their order and in detail.

First. The quilting material, which generally consists of two thicknesses of cloth, with a layer of cotton-batting between them, is first passed between the feed-rollers E and F, then between the upper feed-bar, G, and the under feed-bar, H, and then under the feed-roller J, and between the same and the feed-roller I. The rollers I and J have their bearings in standards F', which can be adjusted by means of the screws F^2. This adjustment is necessary to properly control the operation of these rollers. The tufting material may consist of one or more strands of cord, yarn, or strips of cloth, and is wound on spools K, which turn on a rod, *p*, loosely placed in hangers, *q*, secured to the frame of the machine. It then passes through guides *r*, which project from the hangers, and then through openings *s*, Fig. 7, in the upper feed-bar, G, which brings it directly under the needle. Both the quilting and the tufting material are

then grasped between the feed-bars G and H. These feed-bars run the whole length of the machine, and while both move in a horizontal plane, the upper one, G, also moves vertically, and this vertical motion is controlled in one direction by springs *t*, Fig. 8, and in the other by the feed-bar-lifting mechanism, which will be presently described. Said upper feed-bar, G, is provided at each end with a hub, *u*, from which project lugs *v*, against which press vertical rods *w*, having bearings *a'*, Figs. 2 and 4, in the frame A, and subject to the action of levers *b'*, which are pivoted at *c'* and rest on cams *d'*, mounted on the main shaft L. As the latter revolves, the feed-bar G is raised by means of the cams *d'*, the levers *b'*, and rods *w*, and depressed by the springs *t*, which will cause the same to grasp the work, as above described.

Second. The tufting material is firmly held against the quilting material between the feed-bars and directly under the needle, as above described. The feed-bars, together with both materials, are now caused to move horizontally in a closed curve by a step-by-step motion, while the sewing mechanism also operates and the needle descends and stitches through both materials, producing a small circle or polygon of stitches, (see Fig. 16,) which pass through and serve to hold together both materials. When this has been accomplished, both the primary feed and the sewing mechanism stop. This intermittent circular or polygonal feeding and sewing is produced as follows: On the outer end of the main shaft L is mounted a "mutilated" gear-wheel, M, which engages a pinion, N, secured to one end of a short shaft, *e'*, which has its bearings in the frame A, and the other end of which carries a cog-wheel, *f'*, which meshes into the pinion O on the shaft C, Figs. 2, 3, and 4. In the example shown in the drawings these gears are of such proportions to each other that the shaft C, from which the parts necessary to the "second operation" receive their motion, makes twelve revolutions for every revolution of the mutilated gear-wheel M, carried by the main shaft L; or, in other words, the teeth remaining on said mutilated gear-wheel are sufficient to cause the shaft C to make twelve revolutions, after which the said shaft stands still during that part of the revolution of the mutilated gear in which the blank space comes opposite to the pinion N. To control the last-described operation positively, and to prevent the motion of any of these parts during the time when the blank space passes the pinion N, a flange, *g'*, is formed, Figs. 2 and 3, on the outer side of said pinion, and from it projects an eccentric pin, *h'*, carrying an anti-friction roller. When the pinion N has reached the end of the toothed portion of the gear-wheel M, this eccentric pin *h'* will be opposite the opening of a cam-groove, P, formed in the side of the mutilated gear-wheel, and as the latter revolves the cam-groove will pass over said eccentric pin *h'*, thereby preventing the pinion N and all parts connected with it from turning until the toothed portion of the gear M is again reached, when the cam-groove will release the eccentric pin *h'*, and the pinion N will again be free to turn, subject to the action of the teeth on the mutilated gear M. On the shaft C' is mounted a cam, Q, Figs. 2 and 5, which acts on an anti-friction roller, *i'*, secured to one end of a lever, *j'*, turning on a pivot, *k'*, while the other end of the lever *j'* connects by a rod, *l'*, with a dog, *m'*, on the stud *n'*, and carrying a pawl, *o'*, which engages a ratchet-wheel, *p'*, secured to a cog-wheel, *q'*, which meshes into a pinion, *r'*, mounted on the shaft R, Fig. 5. This shaft, which has its bearings in journals *s'*, secured to the frame, carries a bevel-gear, *t'*, Figs. 4 and 6, at each end, which mesh into similar gears, *u'*, mounted on the upright shafts *v'*, having bearings *w'* in the frame, and carrying at their upper end disks a^2. To these disks are secured other disks, b^2, by means of bolts c^2, Fig. 15, passing through slots d^2. From the disks b^2 project upright eccentric pins e^2, which pass first through the hubs f^2 at each end of the lower feed-bar, H, Figs. 8 and 14, and then through the hubs *u* at each end of the upper feed-bar, G, Fig. 8, so that when the upright shafts *v'*, to which the eccentric pins e^2 are attached, are rotated both the upper and lower feed-bars and the work which is held between them are carried around in a curve similar to the one traveled by the upright eccentric pins e^2. As previously described, each revolution of the main shaft will cause the needle to descend twelve times—that is, the sewing mechanism will make twelve stitches, which, by the peculiar motion given to the work by the feed-bar, will fall in a circle. To form a complete circle of twelve stitches it will be necessary that the feed-bars be carried around in the said circle in eleven steps or feed motions, so that when the needle descends the twelfth time it will strike the spot at which it started and complete the circle. In other words, to make a circle or polygon of stitches it is necessary to make one more stitch than there are feed motions. This is accomplished as follows: The shaft C, which actuates the stitch mechanism, is geared to a shaft, C', in such a manner that the latter will make one revolution less than the former for every revolution of the main shaft L. In this example the shaft C makes twelve revolutions, while the shaft C' will make only eleven. The shaft C' carries the cam Q, and each revolution of this cam will turn the lever *j'* on its pivot against the action of the spring g^2, Fig. 5, and will cause the ratchet-wheel, which has eleven teeth, to be moved forward one tooth, so that when the shaft C' has made the eleven revolutions described above the ratchet-wheel *p'* and the cog-wheel attached to it will have made one complete revolution, while the shaft R, which carries the pinion *r'*, which has only half as many teeth as the cog-wheel *q'*, will have made two revolutions, thus causing the upright shaft *v'* to make two revolutions also,

and to feed twice around the circle described by the eccentric pins e^2. To obviate any liability of breaking the thread as the work is fed around the second time, by the needle again passing down through one of the stitches made before, I cut an odd number—say eleven—teeth in the ratchet-wheel p', which will insure the passage of the needle through a new place in the work at each stitch, and make a polygon of stitches. (Shown in Fig. 16 three times natural size.) In the machine shown the curves made by the eccentric pin e^2 are of a very small diameter—just large enough to securely sew on the tufting; but it is evident that they may be increased to any size and the work quilted in a number of patterns without tufting. For instance, a pattern like Fig. 18 could be produced without any essential change in the mechanism.

Third operation—feeding the work forward to make length of tuft: After the second operation the relative position of the work and the feed-bars will be as shown in Fig. 9—that is, the tufting material will be sewed onto the quilting material near the end of the former, and the needle will be in its upper position, while the work will still be grasped between the feed-bars. It is now necessary to feed the work forward the desired distance, so as to bring the tufting material under the cutting device in such a position that when the latter operates, which will be the next "operation," it will cut a tuft of proper length. To admit of the necessary forward feed, the upper feed-bar must first be raised to its upper position, so as to release the work, while the cutting device, which is loosely attached to this feed-bar, must also be raised to permit the free motion of the work. The raising of the upper feed-bar is accomplished as described in the "first operation" by the cam d', mounted on the main shaft L, while the cutting device is raised by a somewhat similar cam, u^2, Fig. 6, mounted on the same shaft and acting on a lever, v^2, on which rests the rod w^2, abutting against a lug, a^3, on the cutting device. This cam is of such a shape that it will raise the cutting device just clear of the work during this operation and into proper position for action, which will form the next operation. The work, as has been described, is held between the feed-rollers I J, which are caused to move together by flanged gears h^2, and are intermittently rotated by a pawl, i^2, Figs. 1 and 6, acting on the ratchet-wheel j^2. This ratchet-wheel is secured to a cog-wheel, k^2, which turns loosely on a stud, l^2, projecting from the frame, and meshes into a pinion, m^2, mounted on the trunnion n^2 of the roller J. On the main shaft L is mounted a cam, o^2, Figs. 2 and 5, which acts on an arm, p^2, secured to a shaft, q^2, which also carries the arm r^2, Fig. 6, and the latter is connected by a rod, s^2, to a dog, t^2, carrying the pawl i^2. The cam o^2 is so shaped that during this operation it will cause the work to be moved forward only sufficient to form a tuft of proper length. The effect of its further rotation will be described in another operation. At the end of the "third operation" the relative position of the work, the feed-bars, and the cutting device will be as shown in Fig. 10.

Fourth operation—cutting off the tuft: To the back of the upper feed-bar, which is L-shaped, are loosely attached the cutting-bar S and the guide-bar T, and the whole is held together by the action of the spring b^3, whose pressure may be regulated by the nuts c^3, screwed on bolts d^3, which project from the upper feed-bar. (See Fig. 7.) The cutting-bar and the guide-bar are also connected to each other in a like manner by spring-bolts e^3. By reference to Figs. 7, 12, and 13 it will be understood that while the horizontal motion of the feed-bar is also shared by the cutting-bar and the guide-bar, the feed-bar may be moved vertically independently of the others, and vice versa. In one end of the cutting-bar S is a notch, f^3, Fig. 8, which embraces the upper rounded end, g^3, of a lever, U. This notch is of such a shape that when the cutting-bar is down in the position shown in full lines in Fig 8 and in Fig. 9 it will permit the horizontal motion of the cutting-bar as it is carried around with the upper feed-bar, but when raised to the position for cutting (shown in dotted lines in Fig. 8 and in Fig. 10) the sides of the notch f^3 will closely embrace the upper rounded end g^3 of the lever U, and the cutting-bar will move laterally when this lever, which is pivoted at h^3, is acted on by the grooved cam i^3, mounted on the main shaft L, Fig. 2. When the work has been fed forward sufficiently to form the tuft, as described in the previous operation, and the feed and cutting bars have been properly raised, the tufting material will rest in the cutting-notches j^3, formed in the lower edge of the cutting-bar, Fig. 13, and also in the notches k^3 of the guide-bar T. (See Figs. 10, 12, and 13.) The grooved cam i^3 then acts on the cutting-bar, moving the same laterally in the direction of the arrow marked on it in Fig. 8, while the feed and guide bars remain stationary, thereby shearing off the tufting material and finishing the tuft.

Fifth operation—feeding the quilting material forward and sideward until the place for a new tuft comes under the needle: After the cutting operation has been completed, the cam w^2 raises the cutting and guide bars into the position shown in Fig. 11, and the quilting material is now free to move, subject to the action of the feed-rollers E F and I J. The latter now receive a simultaneous lateral and revolving motion. The revolving motion is caused by the cam o^2, which must be of such shape or configuration that while revolving it will effect the motions predicated to it. The quilting material is thus caused to be fed forward, while the sideward motion of the feed-rollers is imparted to them by a forked arm, l^3, Figs. 1 and 4, mounted on the upper end of an upright shaft, m^3, having its bearings n^3

in the frame A. The lower end of this shaft carries a lever, o^3, Fig. 2, one end of which is toothed and engages a toothed segment, p^3, on the end of a shaft, q^3, having its bearings r^3 in the frame, and which receives a slightly-rotating motion by the action of the grooved cam s^3 on an arm, t^3, secured to the lower end of the said shaft q^3. The cam s^3 turns on a stud, u^3, projecting from the frame, and receives its motion from the main shaft L by a pinion, v^3, which meshes into a cog-wheel, w^3, secured to the cam, Figs. 2 and 5. One end of the lever o^3 is connected by a link, a^4, with an arm, b^4, mounted on an upright shaft, c^4, Figs. 4 and 5, having its bearing d^4 in the frame. This shaft carries a forked arm, e^4, at its upper end, and engages a grooved collar, f^4, on the trunnion g^4 of the feed-roller F, Figs. 1 and 4. The feed-rollers E and F are connected by flanged gears h^4 i^4, Figs. 1 and 6.

When the last operation has been completed and the quilting material has reached the position for a new tuft, the upper feed-bar will again descend, clamping the tufting material onto the quilting material, and the five operations above described will be renewed.

A view of a portion of a quilt produced by the above-described machine is shown in Fig. 17.

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

1. The combination, in a quilting-machine, of stitch-forming devices comprising a needle, feed-bars G and H, for clamping the material, means for imparting a step-by-step motion to said feed-bars to present the material to the needle, intermittently-rotating feed-rollers, and means for moving the said rollers laterally to present a fresh part of the material to the feed-bars and needle, substantially as described.

2. The combination, with a stitch forming mechanism, of feed-bars G and H, feed-rollers, and mechanism, substantially as described, for alternately operating said feed bars and rollers and imparting to them, respectively, intermittent motions, as set forth.

3. The combination, with stitch-forming devices, of a primary feed mechanism, means for imparting thereto intermittent movements, the intermittently-rotating feed-rollers, and mechanism for moving the rollers laterally, substantially as described.

4. The combination, with stitch-forming devices, of a primary feed mechanism, means for imparting thereto at intervals a step-by-step motion, independent cloth-feeding mechanism, means for moving the same to feed the material forward, and means for transversely reciprocating said cloth-feeding mechanism, substantially as described.

5. The combination, with a stitch-forming mechanism, of an intermittently-operating primary feed mechanism constructed to carry the work in a closed figure, and mechanism, substantially as described, for causing the stitch-forming mechanism to make one or more stitches in excess of the number of feed motions of the primary feed mechanism, substantially as described.

6. The combination, with the stitch-forming mechanism and the intermittently-moving primary feed mechanism, of the mutilated gear-wheel M, the pinion N, and intermediate connections for imparting said intermittent movements to the primary feed mechanism, substantially as and for the purpose described.

7. The combination, with the stitch-forming mechanism and the intermittently-moving primary feed mechanism, of the mutilated gear-wheel M, provided with a cam-groove, P, the pinion N, carrying the pin h', and intermediate connections for imparting said intermittent movements to the primary feed mechanism, substantially as and for the purpose described.

8. The combination, with the stitch-forming mechanism, of the upper and lower feed-bars, mechanism for imparting a step-by-step movement to said bars, an independent cloth-feed mechanism, and means for moving the latter in a rectilinear path, substantially as described.

9. The combination, with a stitch-forming mechanism, of a primary feed mechanism, the shafts v', the eccentric pins e^2 on the shafts, mechanism for imparting motion to the same, and the connecting devices, substantially as shown and described.

10. The combination, with a stitch-forming mechanism, of the primary feed mechanism, the shafts v', the adjustable eccentric pins e^2 on said shafts, mechanism for imparting motion to the same, and the connecting devices, substantially as shown and described.

11. The combination, with the stitch-forming mechanism, of the upper and under feed-bars, G and H, the shafts v', the eccentric pins e^2 on said shafts, mechanism for imparting motion to the same, and springs t, substantially as shown and described.

12. The combination, with stitch-forming devices, of the upper and lower feed-bars, G and H, the shafts v', the eccentric pins e^2 on said shafts, the ratchet-wheel p', the pawl o', the rotary shaft C′, having the cam Q, and connecting devices between said rotary shaft and the ratchet-wheel and between the latter and the shafts v', substantially as and for the purposes described.

13. The combination, with the stitch-forming mechanism and the primary feed mechanism, of the mutilated gear-wheel M and the pinion N, with the shafts C and C′, the latter carrying the cam Q, and connecting devices, substantially as and for the purpose described.

14. The combination, with a stitch-forming mechanism, of the primary feed mechanism, the independent cloth-feed mechanism, devices for alternately and intermittently operating said feed mechanisms, means for moving the independent cloth-feeding mechanism in a rectilinear path, and the feed-bar-lifting mechanism, substantially as shown and described.

15. In a cloth-feed for quilting-machines,

the combination of the feed-rollers I and J, mounted in standards F′, the adjusting-screws F², and mechanism for intermittently rotating said rollers and moving them laterally, substantially as shown and described.

16. The combination, with a stitch-forming mechanism, of a primary feed mechanism, an independent cloth-feed mechanism, the guide *r*, and the feed-bar G, having the openings *s*, substantially as described.

17. The combination, with a stitch-forming mechanism, of a primary feed mechanism, an independent cloth-feed mechanism, the guide *r*, the tuft-cutting bars S T, and mechanism for operating them, substantially as shown and described.

18. In a machine for tufting quilts, the combination of the cutting-bar S and the guide-bar T, the upper feed-bar, G, having the opening *s*, the lever U, cam *i*³, and shaft L, as shown and described.

19. In a machine for tufting quilts, the combination of the cutting-bar S and the guide-bar T, loosely secured to the feed-bar G, the lever U, and the cam *i*³ and shaft L, substantially as and for the purpose described.

20. In a machine for tufting quilts, the combination of the cutting-bar S and the guide-bar T, loosely secured to the feed-bar G, and adapted to be raised independent of the latter, and the lifting devices for said bars, substantially as described.

21. In a machine for tufting quilts, the combination, with the cutting-bar S and the guide-bar T, of the rod w^2, the lever v^2, the cam u^2, and the shaft L, substantially as and for the purpose described.

22. In a machine for tufting quilts, the combination of the upper feed-bar, G, with the cutting-bar S, provided with cutting-notches *j*³, and a guide-bar, T, provided with notches *h*³, said notches being made to register, and mechanism for imparting endwise motion to the cutter-bar S, substantially as described.

23. The combination, with a stitch-forming mechanism, of a guide for introducing the tufting material to said mechanism, a primary feed mechanism, an independent cloth-feed mechanism, a tuft-cutting device, and mechanism for operating said cutting device, substantially as shown and described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

DAVID H. COLES. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.