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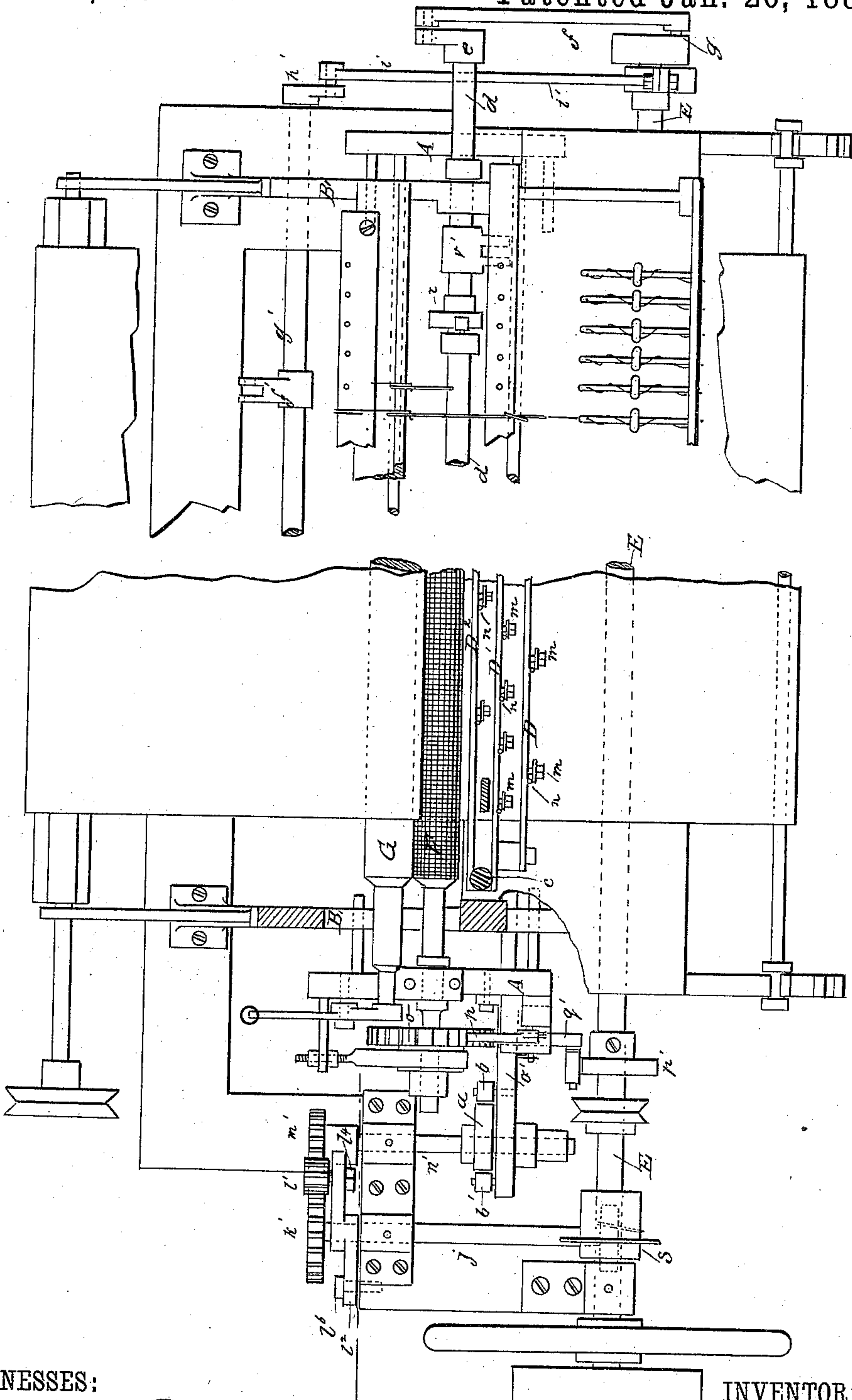
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W. KOCH.
QUILTING MACHINE.

No. 334,955.

Patented Jan. 26, 1886.

Fig. 1.



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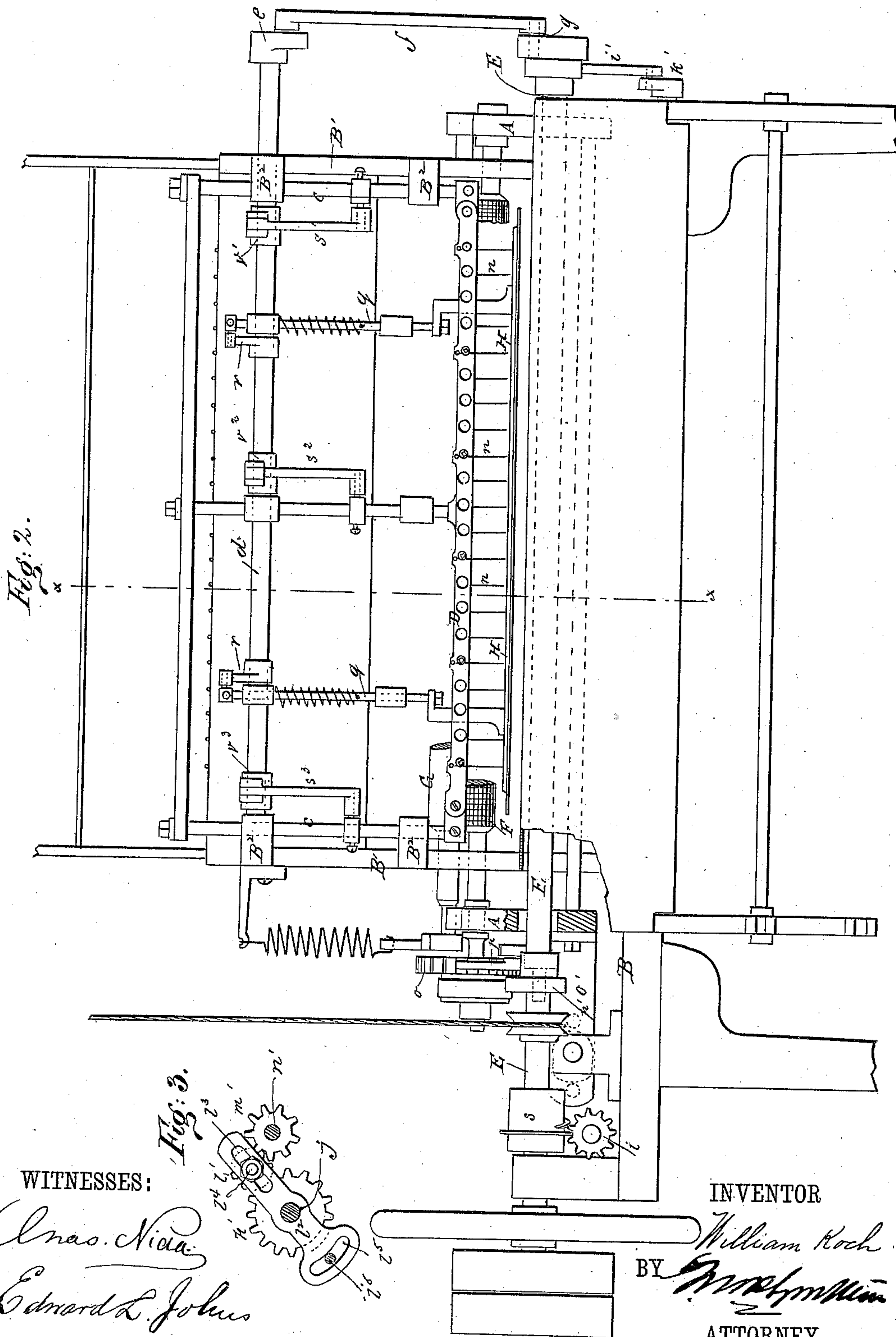
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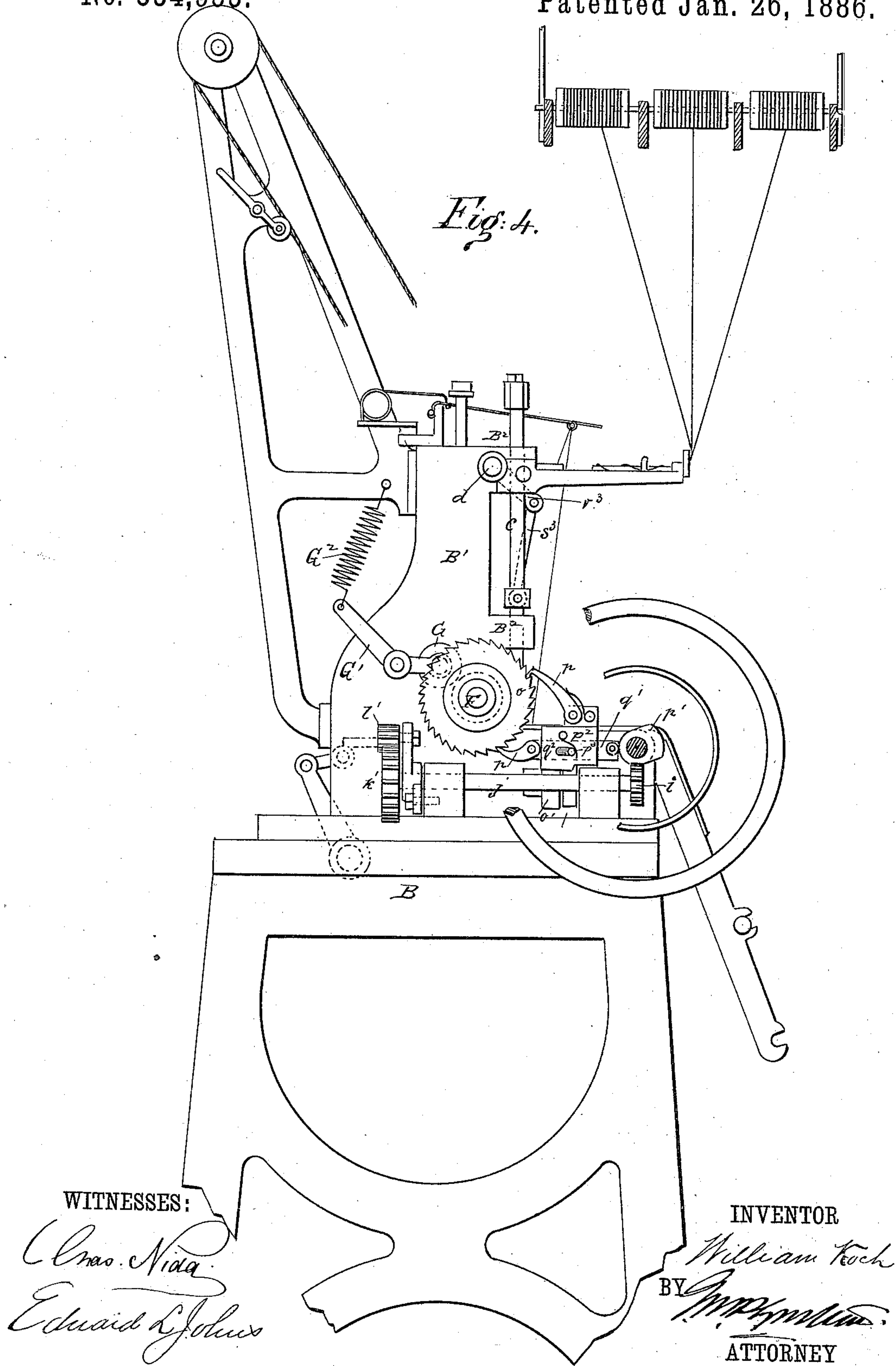
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Fig. 4.



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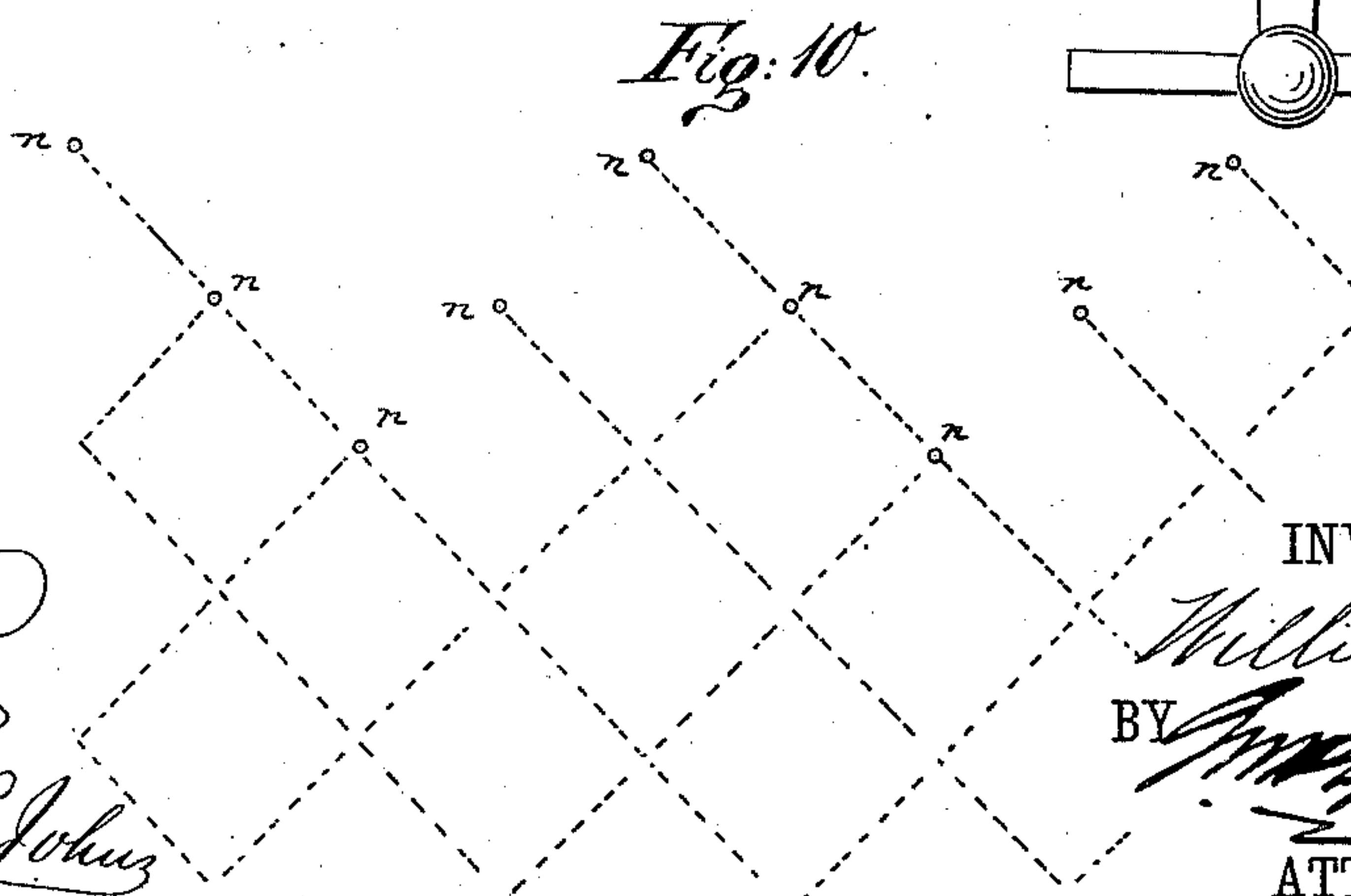
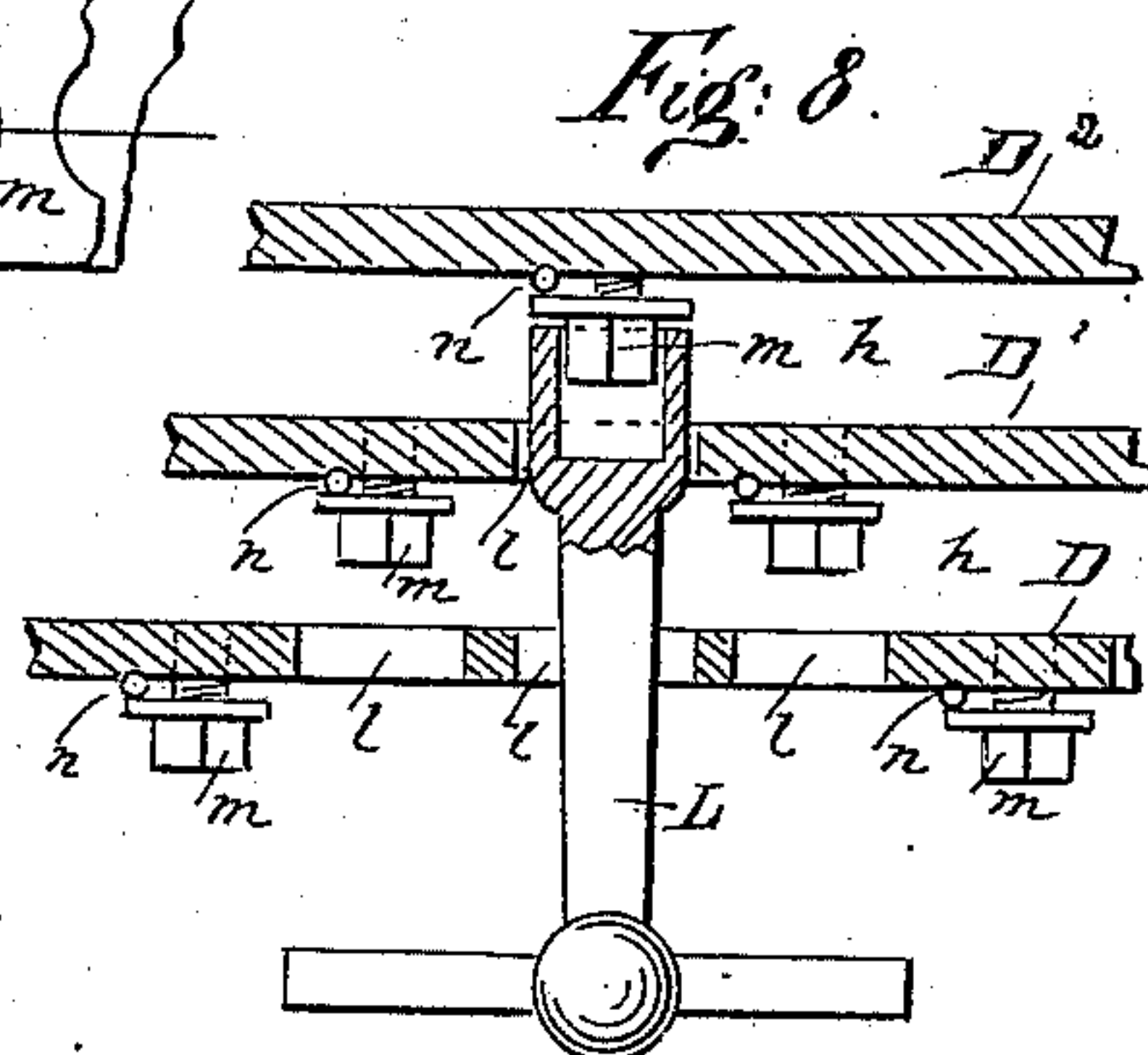
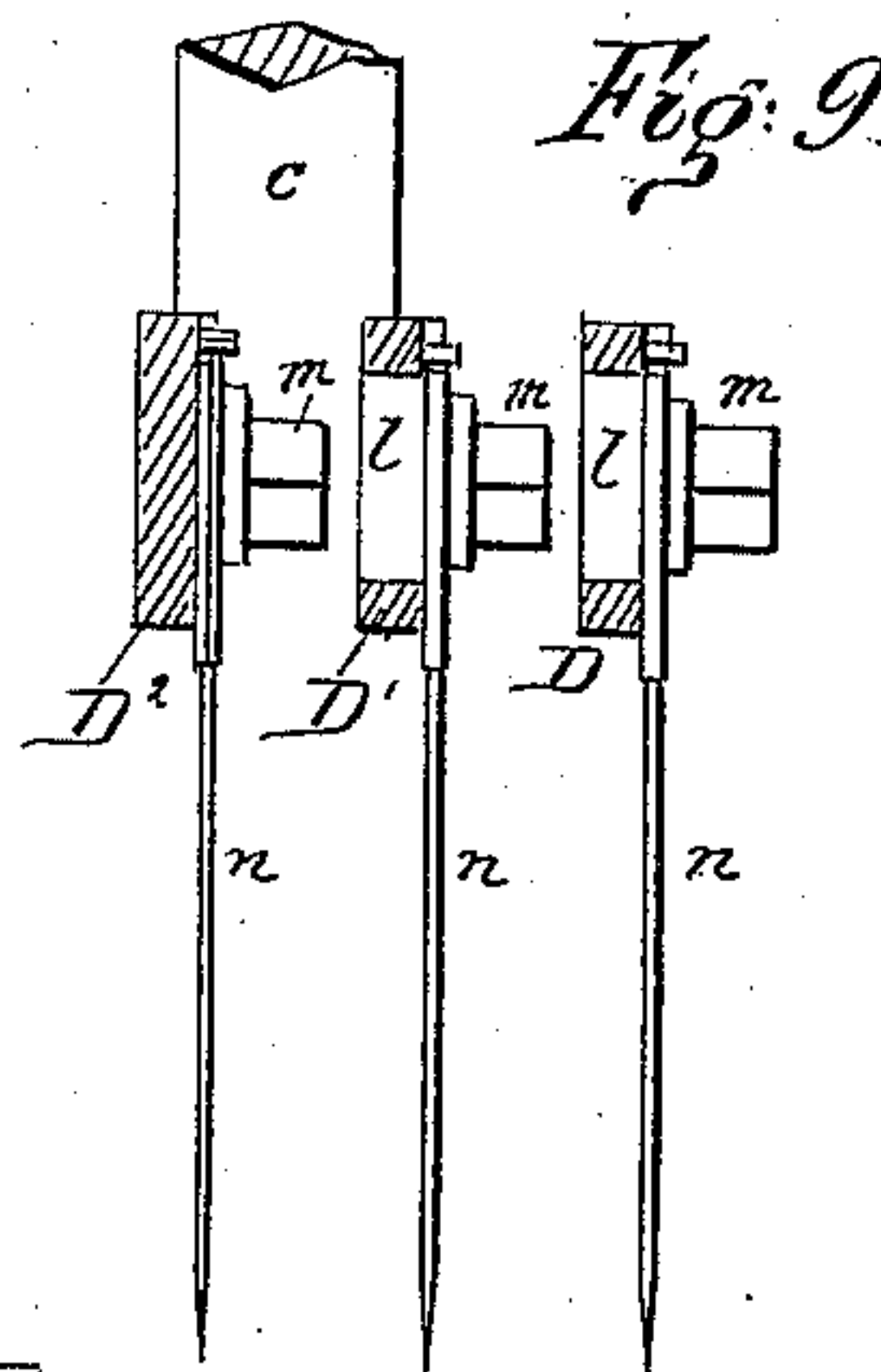
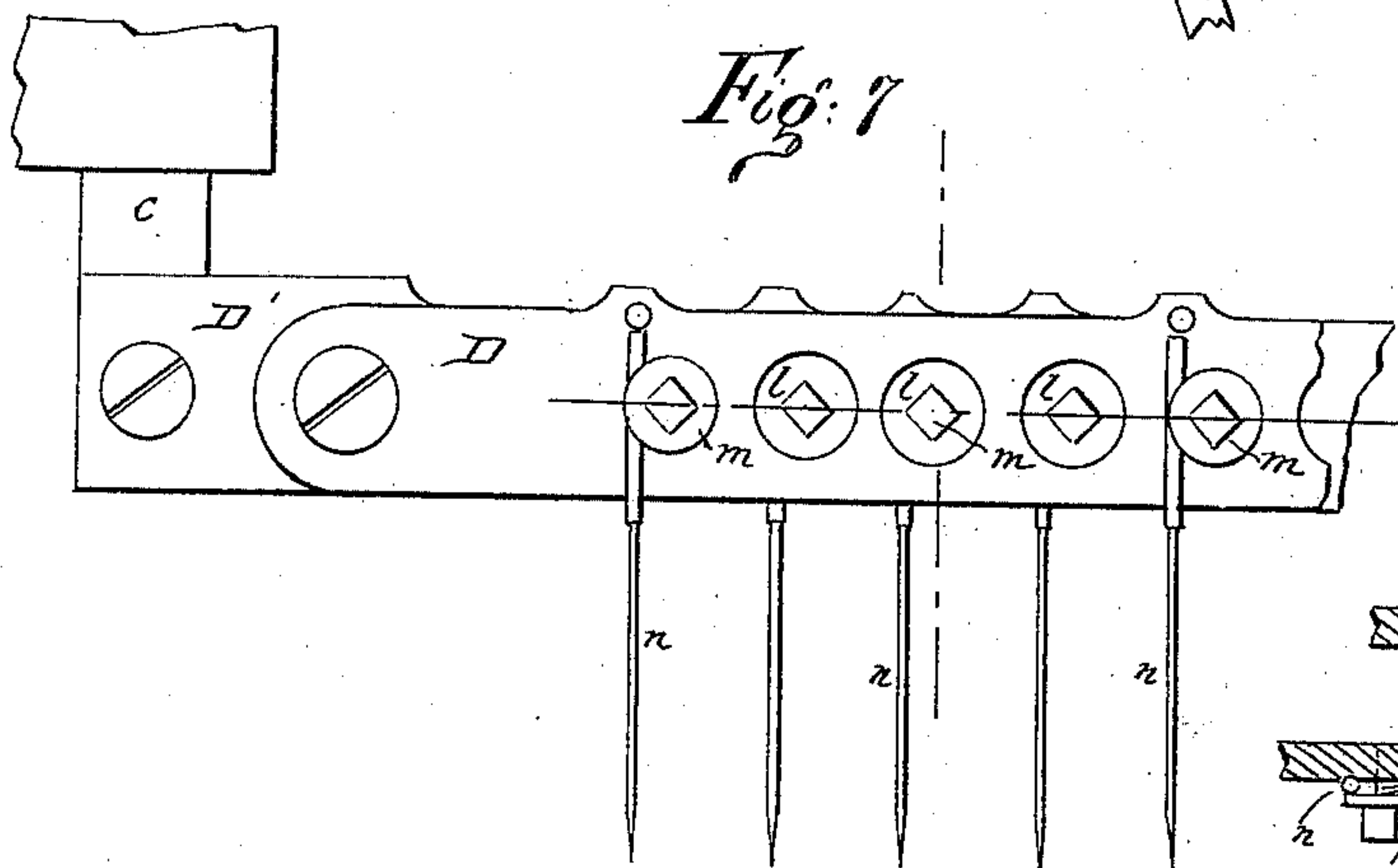
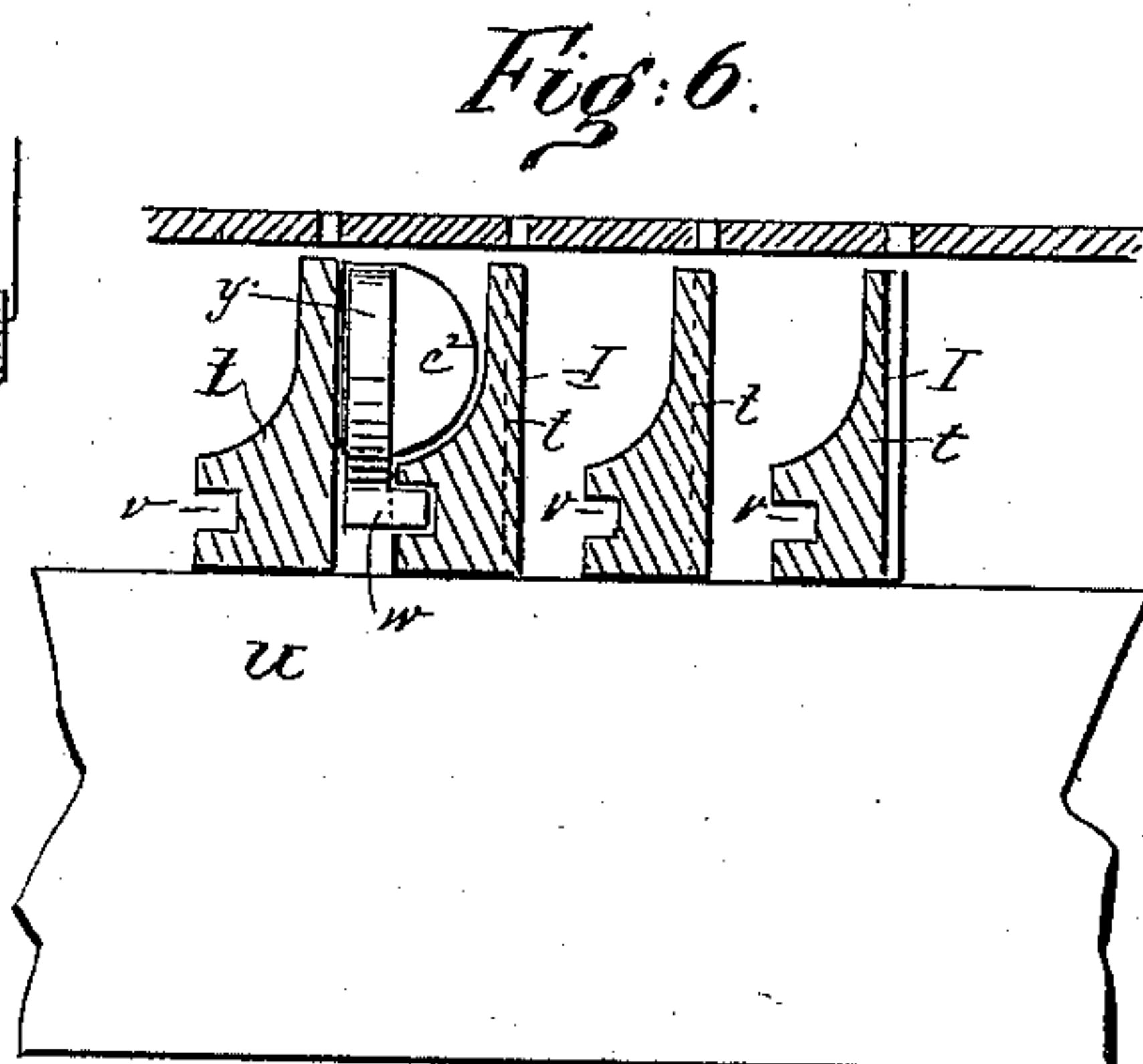
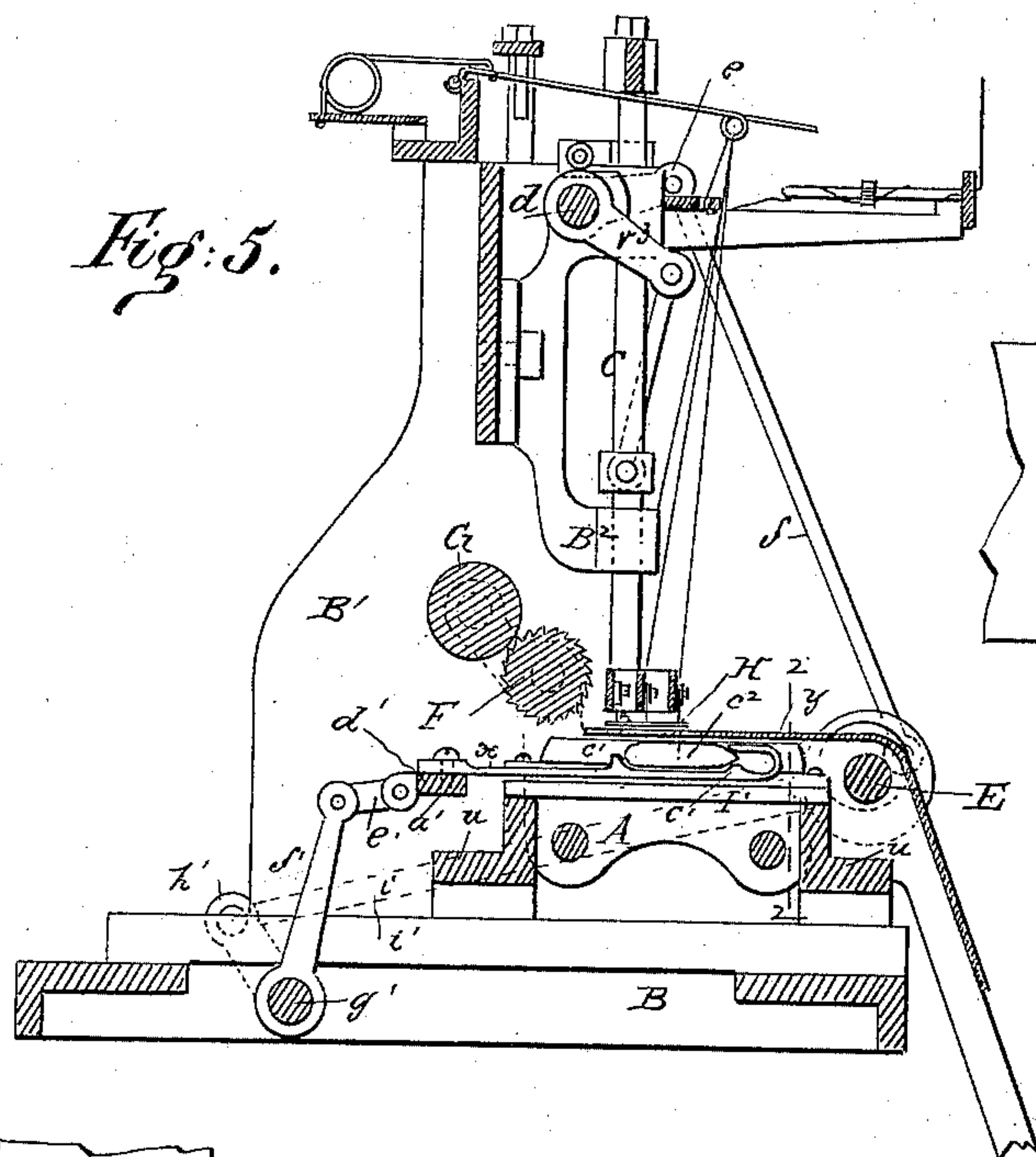
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WILLIAM KOCH, OF NEW YORK, N. Y.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 334,955, dated January 26, 1886.

Application filed January 30, 1884. Serial No. 119,177. (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 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 sheets of drawings, forming part of this specification.

10 This invention is in the nature of an improvement in quilting-machines; and the invention consists, essentially, of vertically-reciprocating needle-bars with a series of needles arranged in three rows, the intermediate
15 row having twice as many needles as the first and third rows, with mechanism by which the fabric is fed forward and simultaneously in a lateral direction, and the mechanism hereinafter particularly described for operating the
20 shuttles, and the mechanism for driving or operating the machine.

The invention also consists in the construction of the needle-bar, in which three rows of needles are arranged, the intermediate row
25 having twice as many needles as the first and third rows, the needles in the middle row being located diagonally in line with and equidistant from the needles of the first and third rows, all the needles being supported by suitable parallel needle-bars, two of said bars being
30 provided with openings, whereby the set-screws which hold the needles may be regulated.

In the accompanying sheet of drawings, Figure 1 is a plan or top view of my machine, partly in section. Fig. 2 is a front elevation of the machine, partly in section. Fig. 3 is a detailed view of the mechanism for operating the lateral movement of the carriage. Fig.
40 4 is an end view of the machine, showing feed-ratchet and pawls. Fig. 5 is a vertical section taken in the line $x x$, Fig. 2, showing shuttle-race and mechanism for operating the shuttle. Fig. 6 is a vertical section of the shuttle-race
45 in the plane of line 2 2, Fig. 5, looking to the left and omitting the rods shown in section in said figure. Fig. 7 is a side elevation of needle-bar. Fig. 8 is a horizontal section of needle-bars, needles, and set-screw openings,
50 showing the position of the needles and application of key for adjusting set-screws of same.

Fig. 9 is a vertical section of needle-bars. Fig. 10 is a plan or diagram showing one form of stitching made by the needles.

Similar letters of reference indicate like parts 55 in the several figures.

My invention relates to a quilting-machine of the ordinary type—that is, a machine having the well-known lateral reciprocating motion imparted to its bed or carriage in addition to the common vertical reciprocating motion of its needle-bar; and the essential features of the invention consist in combining with such a quilting-machine needle-bars to which are fixed a series of needles arranged
60 in three distinct rows, one row behind the other, the middle row containing twice as many needles as either the first or third rows, which needles are diagonally in line with and equidistant from each other. 70

In the construction of my machine a series of organized sewing mechanisms are arranged with a carriage, A, constructed to move horizontally or to have a horizontal reciprocating motion on the supporting-frame B. This horizontal reciprocating motion is imparted by a
75 cam, a , which, as it revolves alternately, brings its greater and lesser diameter in contact with rollers b and b' , the revolving motion of the cam being imparted by or through a worm-
80 wheel, s ; but the reciprocating of the carriage may be accomplished in any other desirable manner.

To the frame B are fixed uprights B' , which support brackets B'' , through which the vertical reciprocating bars c of the needle-bars D
85 D' D'' work.

d is a rock-shaft connected with and rocked from the main shaft E by means of the cranks e and g on said shafts d and E, respectively, 90 and their connecting-rod f .

The bars c , carrying the needle-bars, receive a vertical reciprocating motion from the rock-shaft d by means of the cranks v' v'' v''' fast on shaft d , and the links s' s'' s''' jointed to the
95 bars c .

The needle-bars D D' D'' , which are secured to the lower ends of the reciprocating bars c , consist of three bars, D D' D'' , placed parallel and behind each other, and extending from one
100 reciprocating bar c to the other. These needle-bars are fixed so as to have a small space,

h, between them, and the first and second bars, D and D', are provided with perforations l, every other perforation in one bar being coincident with a perforation in the other bar.
 5 To the needle-bars are fixed, by means of ordinary set-screws, m, the needles n. These needles in the needle-bar are so fixed that there shall be three distinct rows of needles, one behind the other, the middle bar containing
 10 twice as many needles as the first and third rows, and the needles of the middle row are diagonally in line with each of the outer rows of needles and equidistant from the same.

The machine is provided with a feed-roll, F, and a smoothing or friction roll, G, which
 15 roll F revolves with an intermittent motion by means of one or more ratchet-wheels, o, fixed to the outer end or ends of said feed-roll F, rotated tooth by tooth by pawls p, as will presently appear, the smoothing-roll G revolving
 20 by the friction of the cloth as it passes beneath it. The roll G is supported in rock-arms G', held up by springs G², to press the said roll on roll F; or it may be otherwise yieldingly held
 25 in any well-known way.

The machine is provided with a presser-foot, H, which presser-foot extends continuously across the width of the machine beneath the
 30 needles, it being perforated to permit the needles to pass through it, and it is connected with the shaft d by connecting-bars q and cranks r, as is shown in Fig. 2.

The shuttles and shuttle-races are arranged below the cloth-plate, and are made to correspond with the position of the needles. Each
 35 shuttle-race consists of a raceway, I, composed of two parallel bars of metal, t, fixed to supports u, at suitable distances apart, to receive the shuttle, the inner faces of each of these
 40 parallel bars being formed of such shape as will allow the shuttle to be received snugly between the bars t. The base of each bar t has formed in it, in the direction of its length, a rabbet or groove, v, so that when the bars t
 45 are placed in position on the supports u, one rabbet or groove, v, will open into the space between the two bars t. Into these rabbets or grooves v is fitted the edge of the head w of a stem, x, which stem or shuttle-carrier is
 50 provided at its head with a hook, y, and at its opposite end with a pin-hole, a'. This stem has also on its upper surface projections c', to receive the shuttle c², and by means of the pin-hole before mentioned is fixed a bar, d', which
 55 bar extends across the width of the machine, and to this bar d', by means of a link, e', a crank, f', and a shaft, g', crank h', and connecting-rod i', the last-named rod i' being strapped eccentrically to the shaft E, a reciprocating motion is given, and this bar gives a
 60 corresponding motion to the stem x, which in turn carries with like motion the several shuttles beneath the needles.

Now, when my quilting-machine is constructed substantially as hereinbefore described, its operation is as follows: The fabric
 65 to be quilted is passed over the cloth-plate of

the machine, and motion is imparted to the driving-shaft E, and as the shaft is revolved by means of its worm s and worm-wheel i, 70 shaft j, and gear-wheels k', l', and m', a revolving motion through an intermediate shaft, n', is imparted to the cam a, so that as the cam alternately brings its greater and lesser diameter in contact with the rollers b and b', the
 75 carriage A has given to it, through a connecting-bar, o', a reciprocating horizontal motion on the supporting-frame B of the machine. As this driving-shaft E continues to revolve by means of a cam, p', fixed to that shaft, and
 80 a sliding block, q', the pawls p give an intermittent motion to the ratchet wheel or wheels o, causing the feed-roll F to revolve with a like intermittent motion. The block q' is returned after the operation of the cam p' by
 85 means of a spring, p², acting against a pin, p³, on the said block, and projecting through a slot in the block-holder q². The upper pawl, p, is also spring-pressed; but it may serve simply as a detent. This driving-shaft E still
 90 continues to revolve through or by means of the wrist-pin g and the connecting-rod f and crank e. A partial rotary or rocking motion is given to the shaft d, and as this shaft d is in this way rocked through or by
 95 means of cranks v' v² v³, fixed to it and connecting-rods s', s², and s³, the bars c are caused to reciprocate vertically, and with this motion alternately carry upward and downward the
 100 needle-bars D D' D², and also through or by means of cranks r and r' and suitable connecting-bars q q, fixed to the rocking shaft d, move upward and downward with a reciprocating motion the presser-foot H.

The several parts of the mechanism of the machine being now in motion, as described, 105 the fabric to be quilted is drawn or fed by the operation of the feed-roll F beneath the needles n, the presser-foot H pressing the fabric closely upon the surface of the cloth-plate until the needles have passed through the fabric
 110 to form the stitches, the smoothing or friction roller G keeping the fabric smooth and assisting the feed-roller to "bite" the surface of the fabric, and as the needles descend the shuttles, operating in the manner hereinbefore described, pass through the loops of the thread making the lock-stitch. Now, it will be seen
 115 that since the needles n are arranged in a series of three rows, and so that the needles of the middle row are diagonally in line with the needles of the first and third rows, and that as these needles are moving up and down in a
 120 vertical direction simultaneously with the lateral reciprocating motion of the carriage of the machine, diagonal lines of stitches are formed in the material to be quilted. By the lateral motion of the carriage in opposite directions, the direction of the diagonal lines of
 125 stitches is reversed, whereby each needle produces a zigzag line of stitches, which meets the zigzag lines of stitches of the adjoining needles at the angles of said needles, so as to impart thereby to the fabric the character of
 130

intercrossing diagonal lines of stitches that form regular diamonds, as is shown in Fig. 10 of the drawings.

It will be observed that by reason of the intermittent revolving motion of the feed-roll F the feeding of the fabric beneath the needles ceases at the instant the needles enter the fabric, and is resumed the instant the needles clear the fabric in their upward movement.

In Fig. 3 I have shown an arrangement of gearing for varying the speed of the carriage-reciprocating mechanism. The pinions h' and m' are mounted on their shafts j and n' , and on shaft j , I hang an arm, l^2 , in one end of which is a longitudinal slot, l^3 , in which is adjustably secured a bolt, l^4 , which serves as the pin or nib on which the idler-pinion l' revolves. The lower end of the arm l^2 is slotted, l^5 , transversely in an arc of a circle, and is secured to the frame B thereat by a set-screw, l^6 . By these means idler-pinions l' of different diameter may be interposed between the pinions h' and m' to vary the speed of the latter.

When it is desired to change the form or character of the lines of stitching produced by the needles, this may be accomplished by substituting larger or smaller wheels for the gear-wheels l' , such substitution resulting in increasing or diminishing the extent of the horizontal reciprocating throw of the carriage A, so that the point or points at which the stitching of each needle crosses the stitching of the other needle, or rather the angle at which such crossing takes place, will be increased or lessened, and thereby produce corresponding changes in the form or design of the stitching on the fabric, and a number of different designs or variegated effects can be produced in a quick, economical, and effective manner by the combined action of the mechanism hereinbefore described for moving the fabric, and the action of the needle-bars having three independent rows of needles. Since the three rows of needles are arranged one row behind the other, it would be difficult to remove, replace, or tighten the needles in the rearmost rows, unless some provision were made for that purpose, and to that end the perforations l are formed in the first and middle needle-bars, so that through these perforations a key, L, can be passed and the set-screws m of the needles

be reached for the purpose of tightening or slackening them, as the exigency may require.

The thread-take-up mechanism and the mechanism for beaming the fabric as it is quilted are shown, and may be of usual construction, and form, with other parts shown but not described, no part of this invention.

I hereby reserve for my application Serial No. 176,373, filed September 7, 1885, the claims for the shuttle race and carrier herein shown, but not claimed. At the same time I direct attention to my Patent No. 323,584, dated August 4, 1885, the application for which was filed May 20, 1885, as covering one specific form of my invention in shuttle-carriers.

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 of a vertically-reciprocating needle-bar having a series of needles arranged in three rows, one behind the other, the intermediate row having twice as many needles as the first or third row, the needles of said intermediate row being set in a diagonal line with and equidistant from the needles of the first and third rows, devices for feeding the fabric forward beneath the needles, and mechanism whereby laterally-reciprocating motion is imparted to the entire sewing mechanisms, substantially as set forth.

2. In a quilting-machine, a needle-bar constructed with three rows of needles, one behind the other, the intermediate row having twice as many needles as the first and third row, which needles are located in a diagonal line with and equidistant from the needles of the first and third rows, substantially as specified, in combination with means for operating the needle-bar.

3. In a quilting-machine with two or more parallel needle-bars and needles fixed thereto, a series of openings in the needle-bars, whereby the set-screws of the rearmost needle-bars may be adjusted, as and for the purpose described.

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Witnesses:

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EDWARD L. JOHNS.