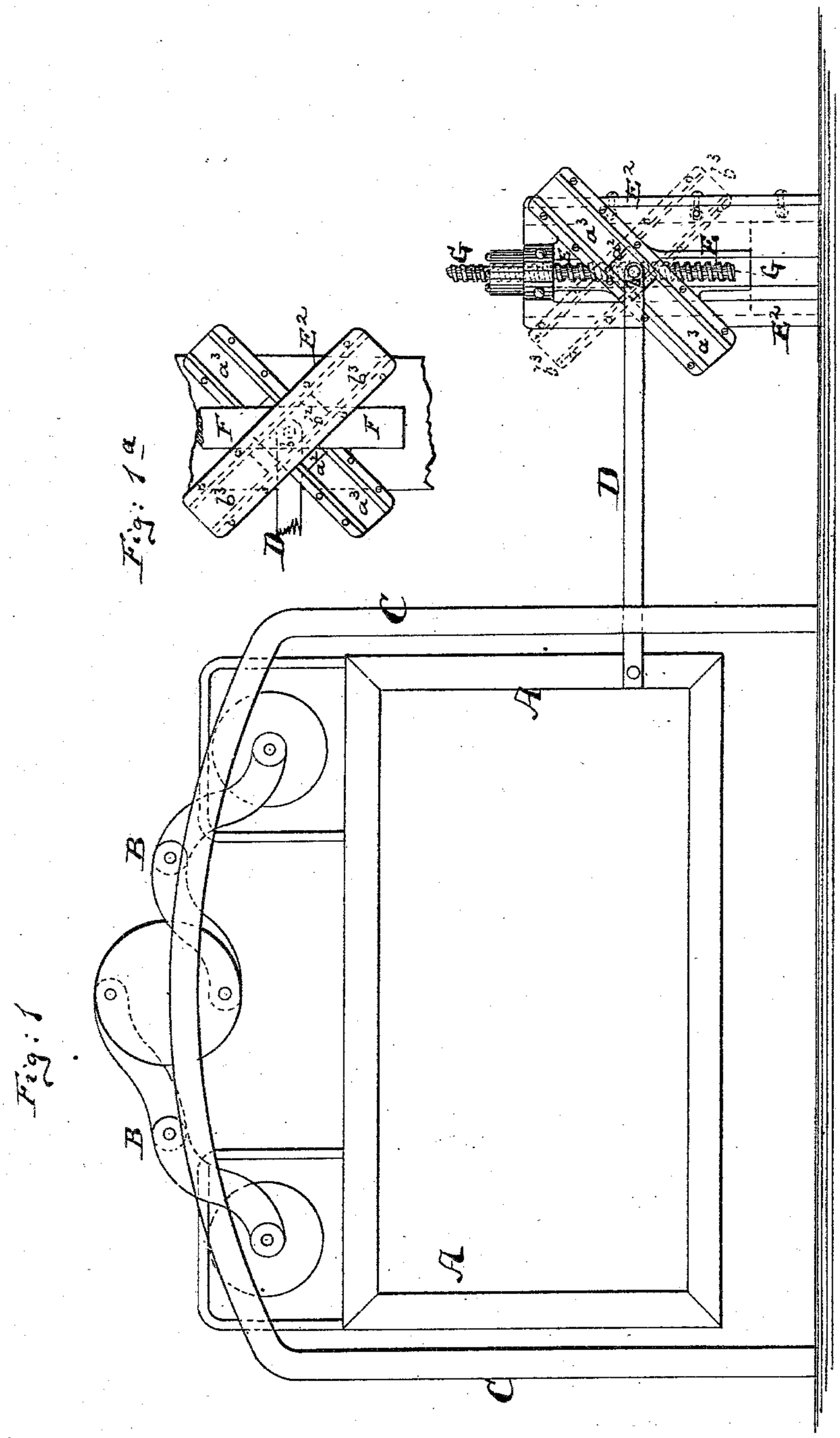
(No Model.) 8 Sheets—Sheet 1

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 283,707. Patented Aug. 21, 1883.



Witnesses
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John M. Speer.

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(No Model.)

8 Sheets—Sheet 2.

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 283,707. Patented Aug. 21, 1883.

Fig. 2a

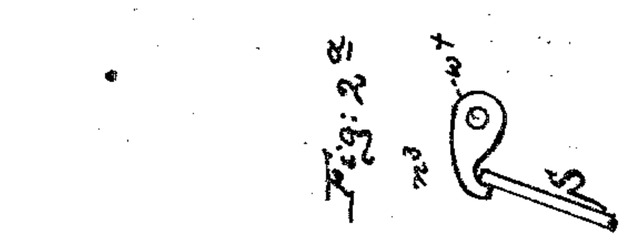

Fig. 2b

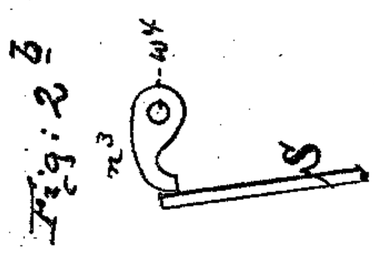

Fig. 2

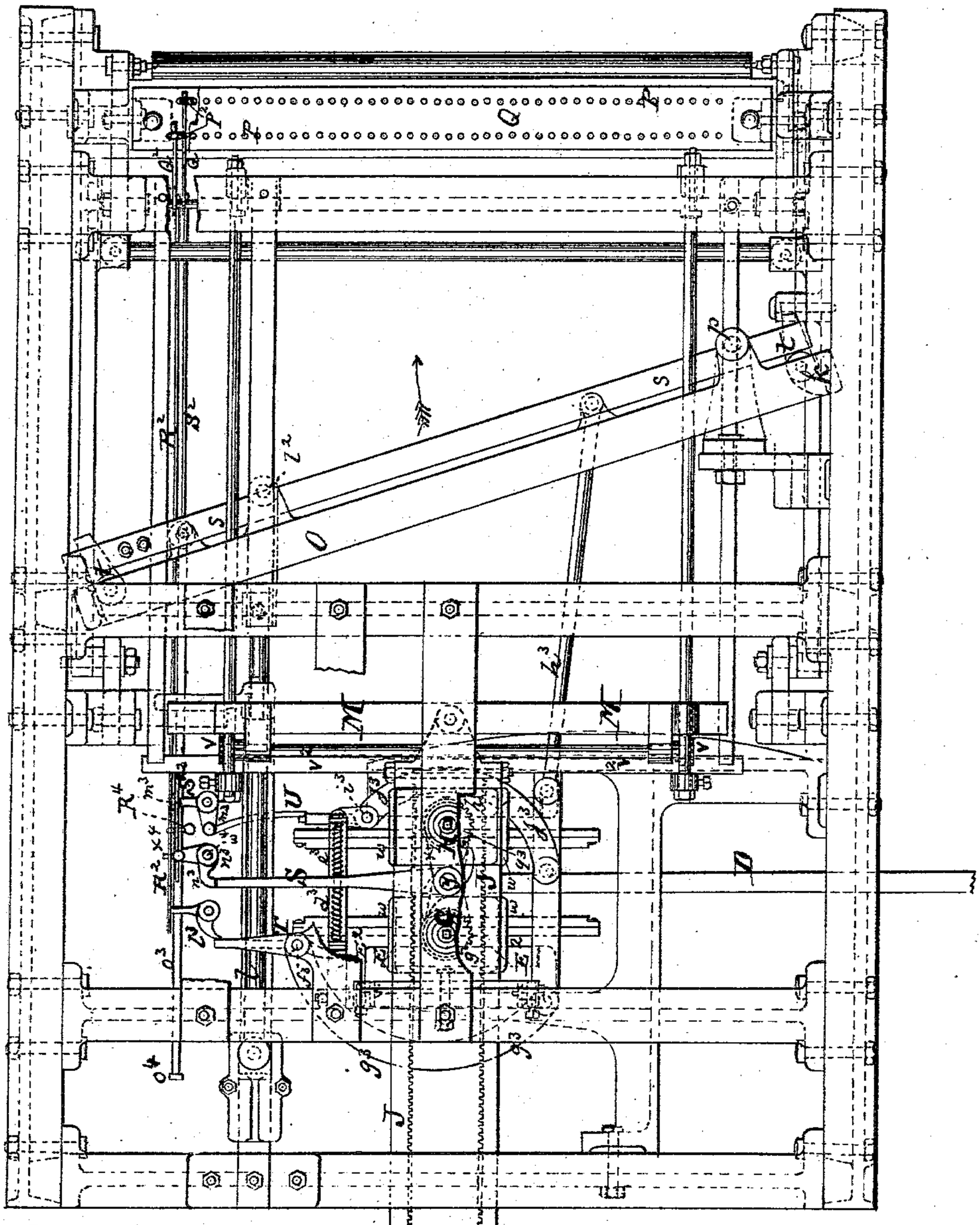

Fig. 2c

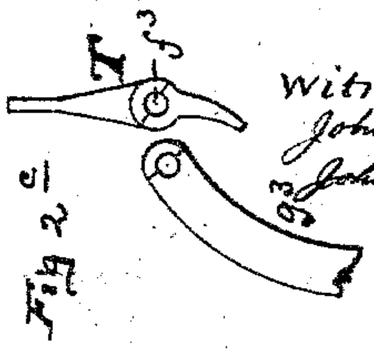

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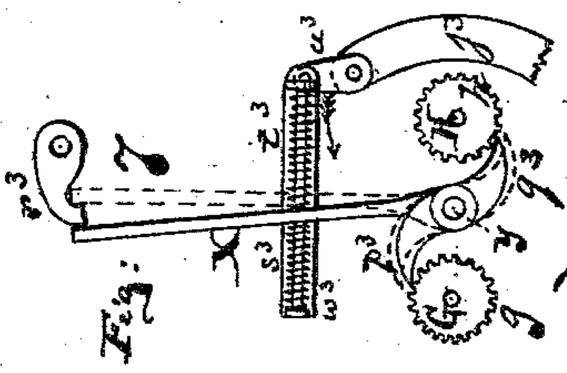
Fig. 3



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(No Model.) 8 Sheets—Sheet 3.

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 283,707. Patented Aug. 21, 1883.

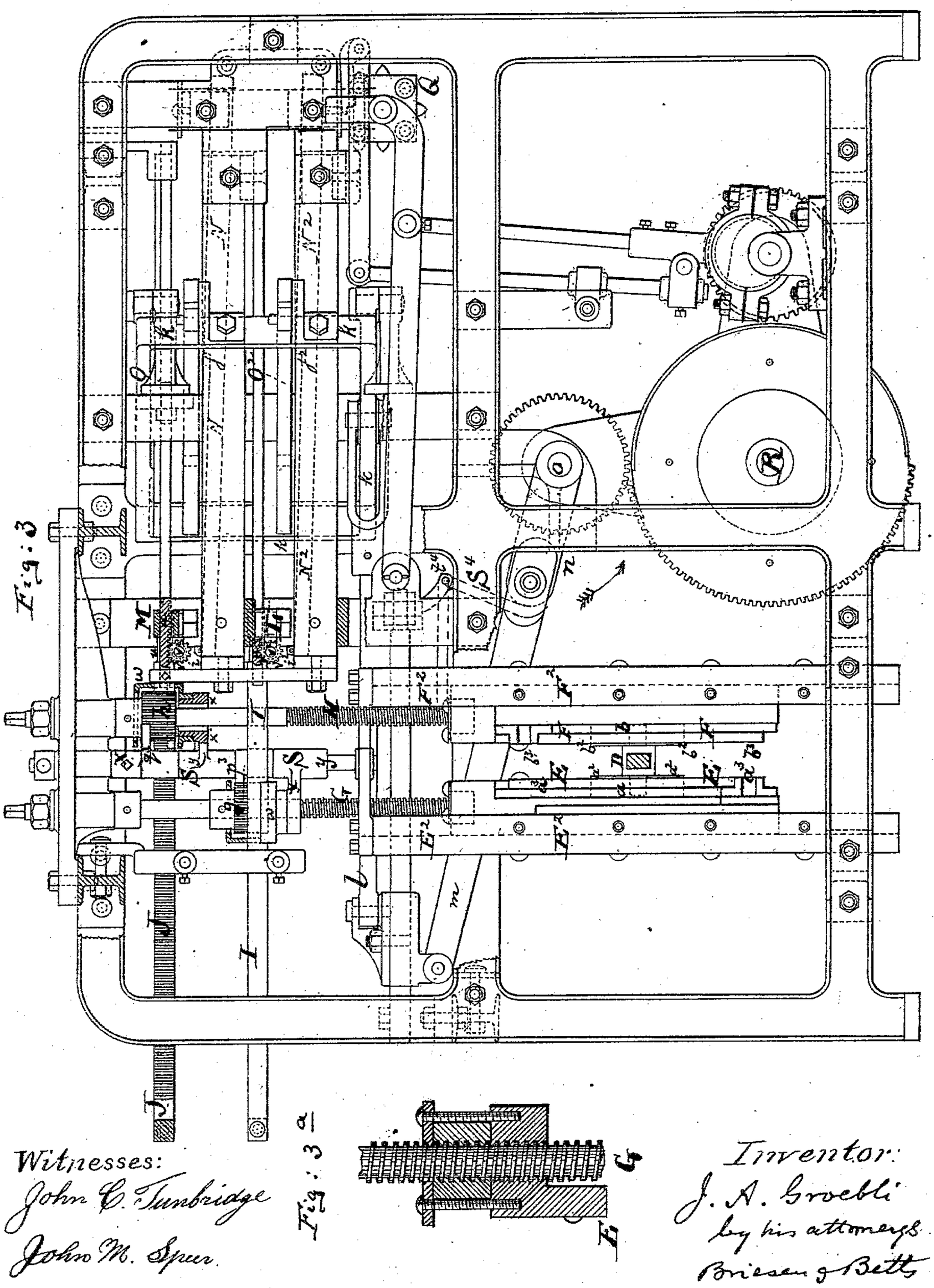

Fig. 3.

Fig. 3a.

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(No Model.) 8 Sheets—Sheet 4.

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No. 283,707. Patented Aug. 21, 1883.

Fig: 6

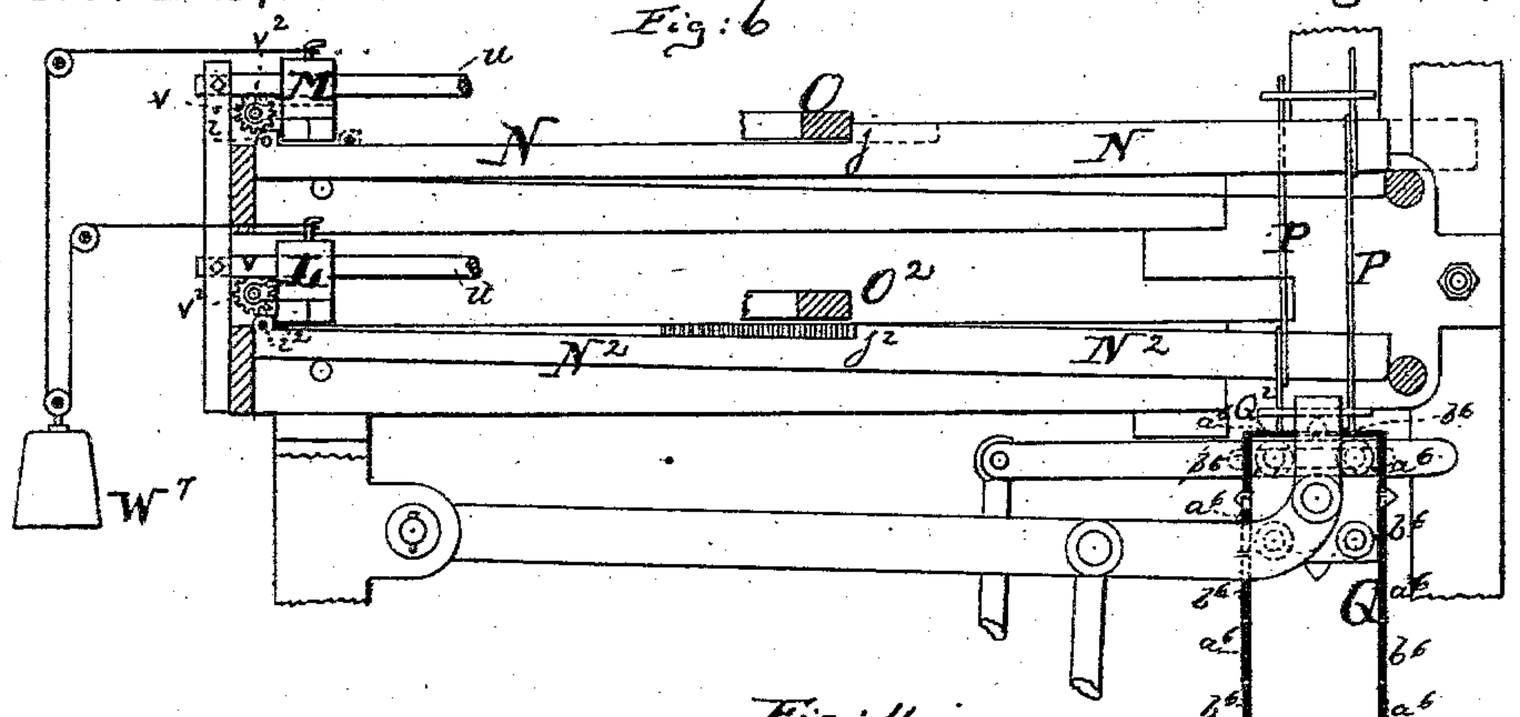


Fig: 4

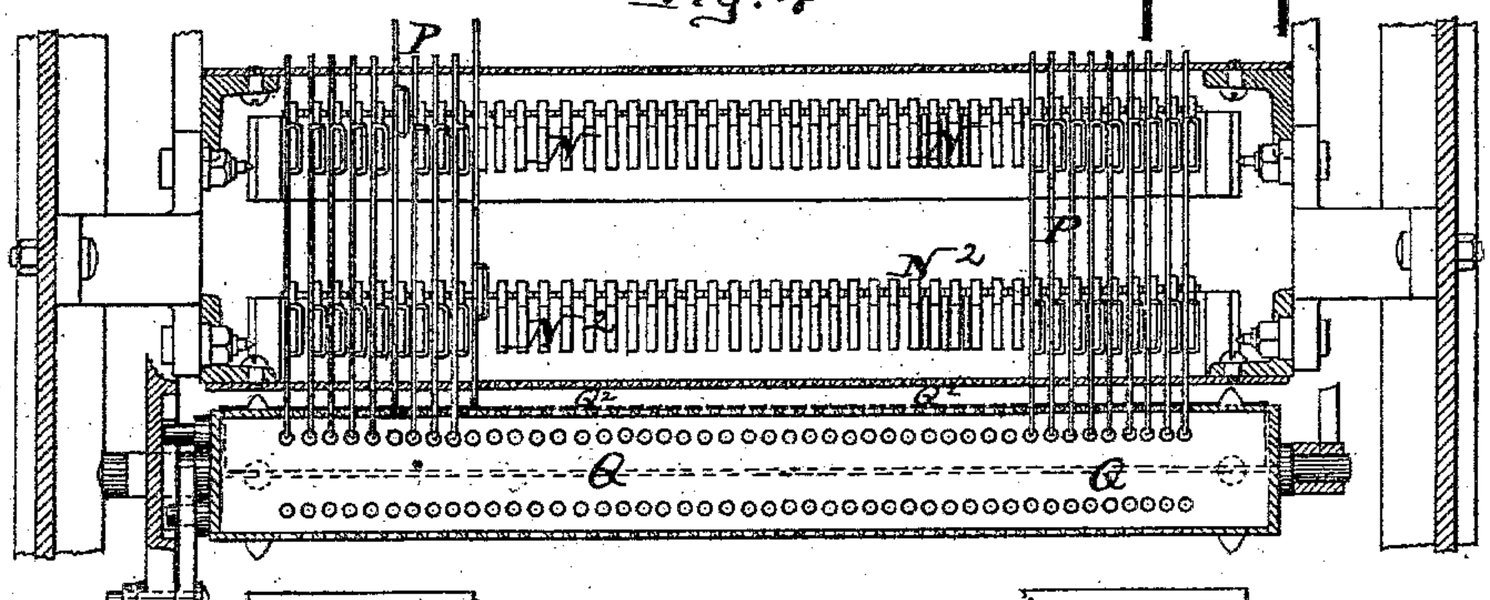
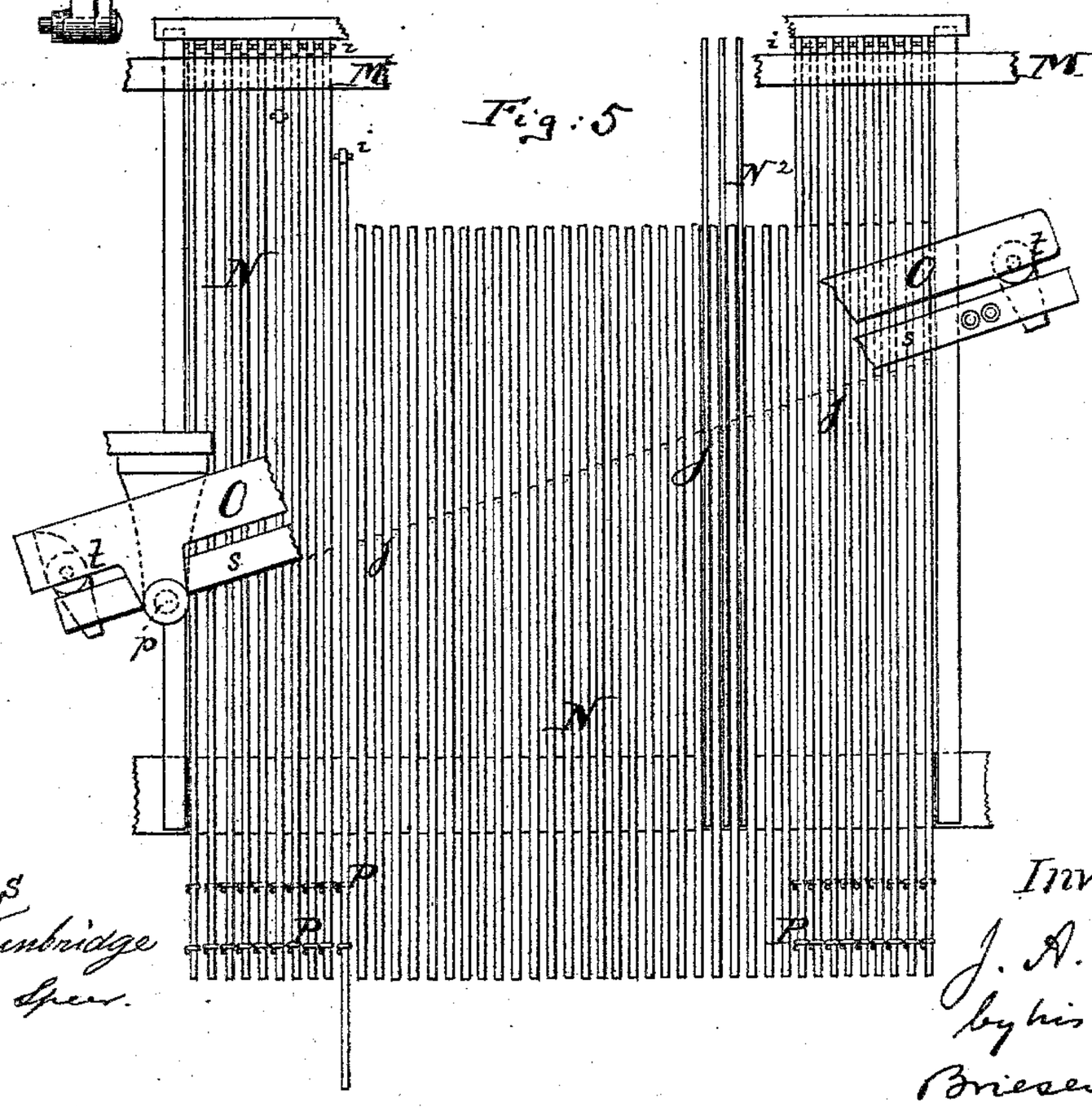


Fig: 5



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No. 283,707. Patented Aug. 21, 1883.

Fig: 9

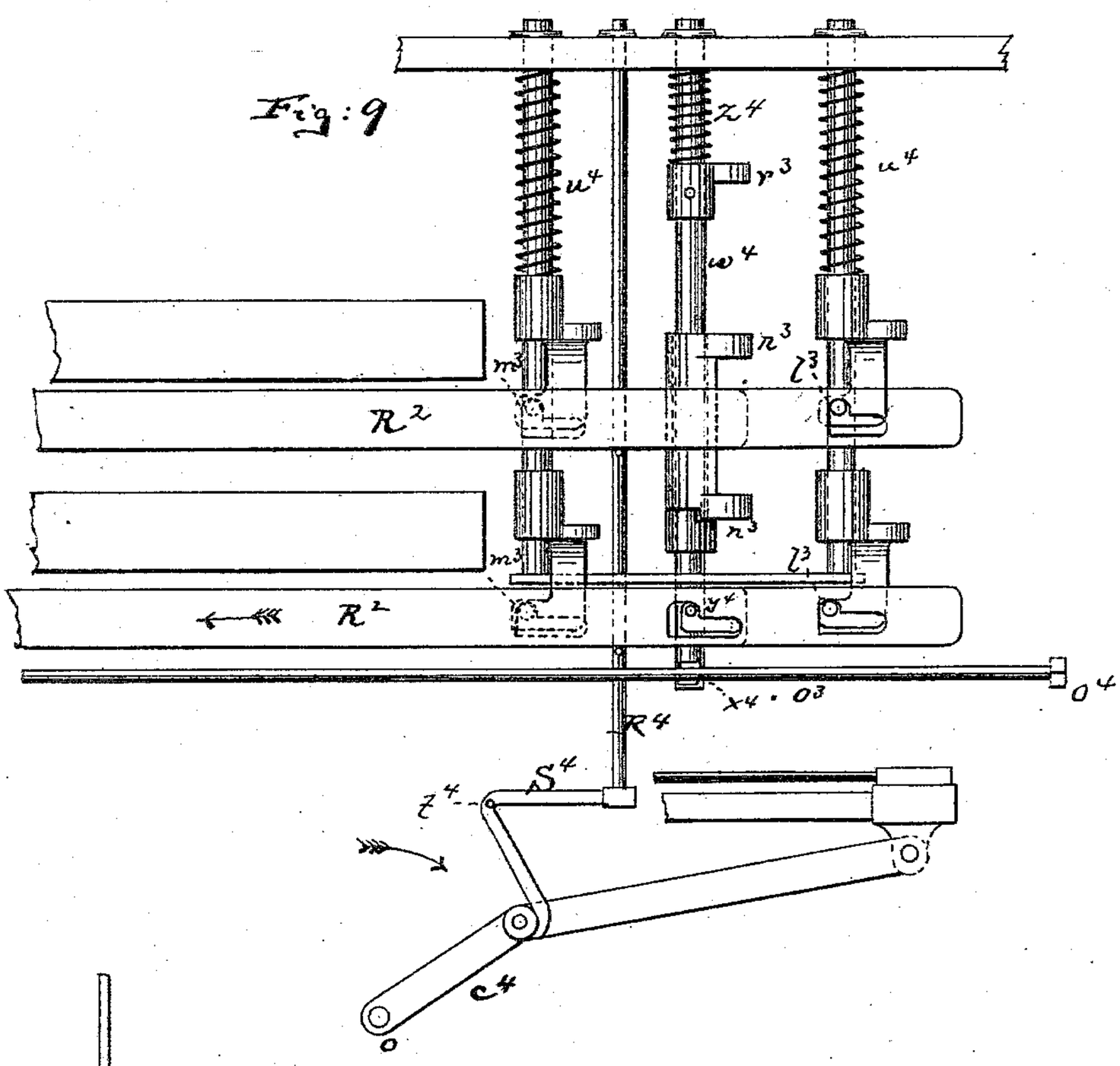
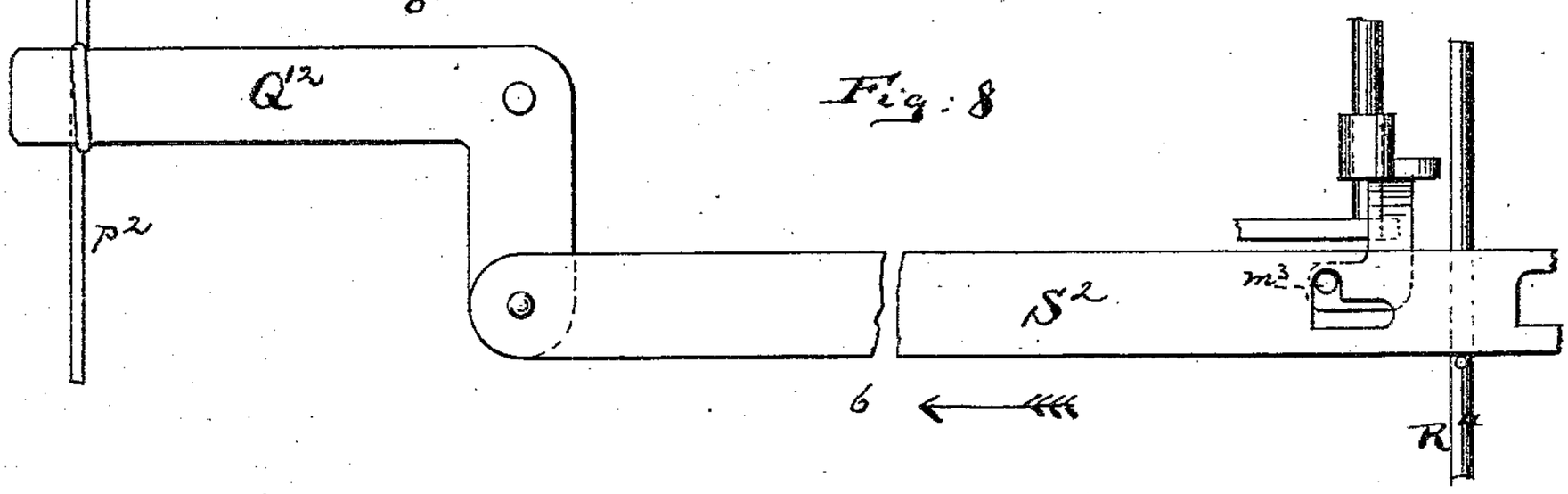


Fig: 8



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(No Model.) 8 Sheets—Sheet 6.

J. A. GROEBLI.

EMBROIDERING MACHINE.

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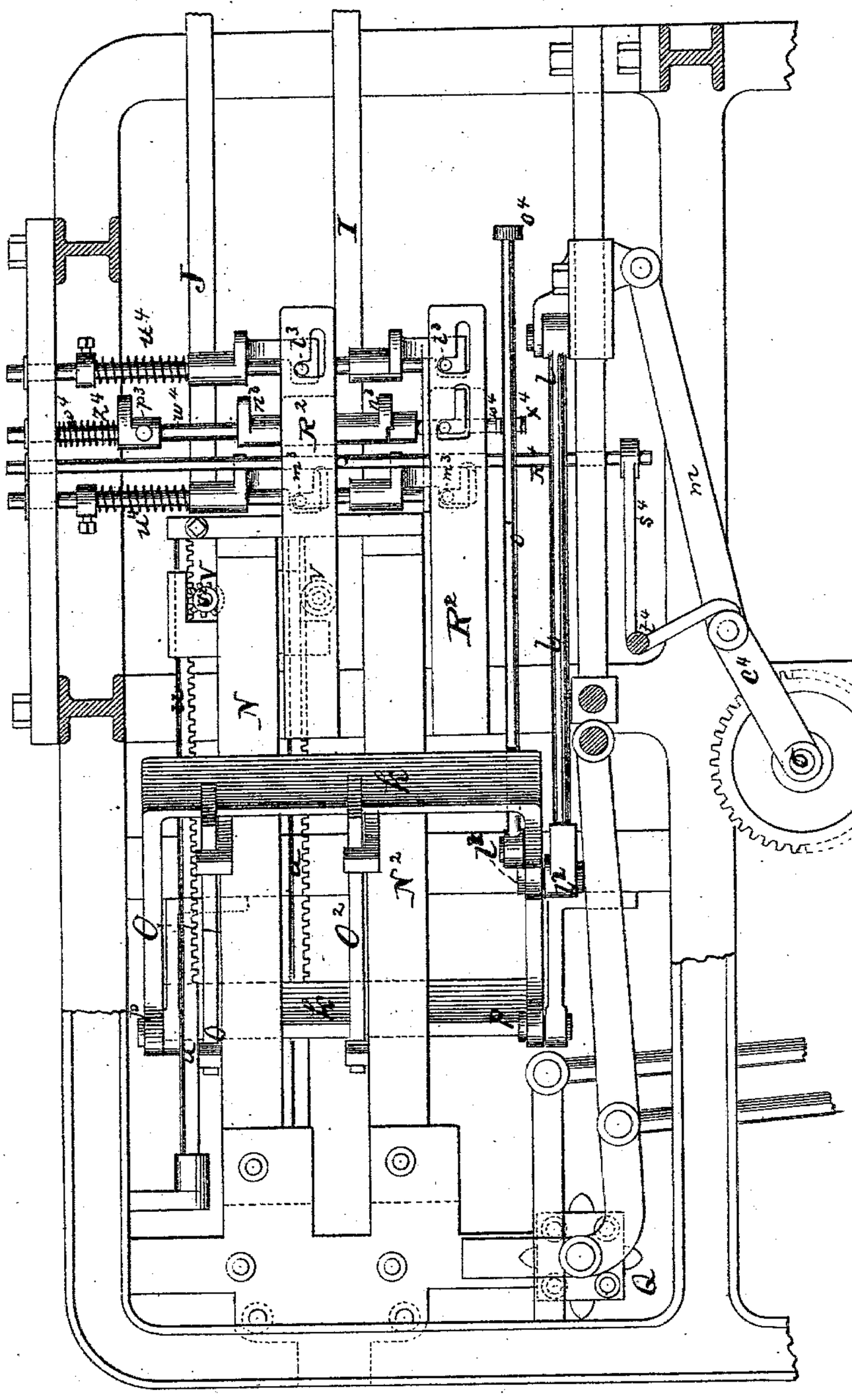

Fig. 10

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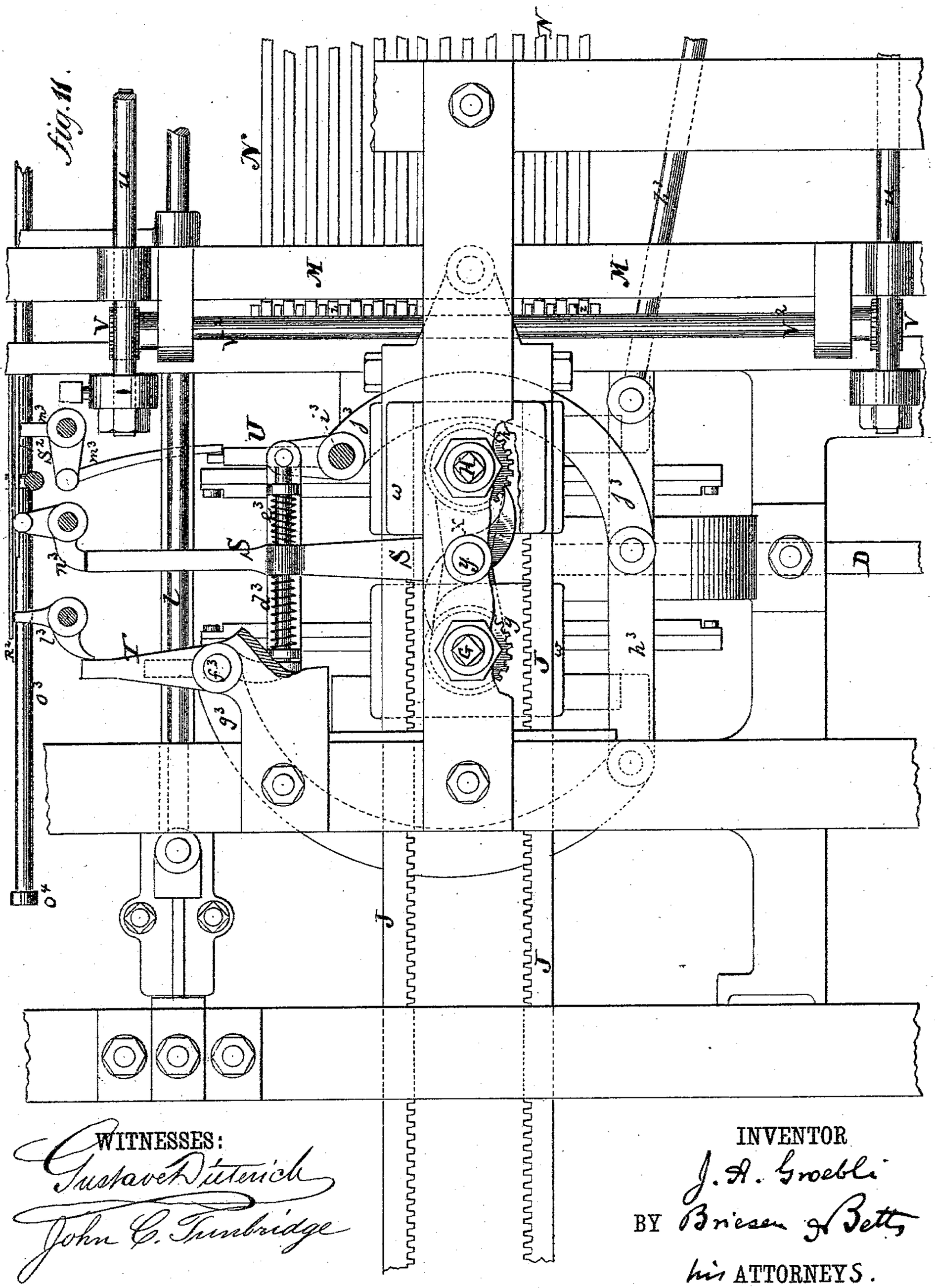
(No Model.) 8 Sheets—Sheet 7.

J. A. GROEBLI.

EMBROIDERING MACHINE.

No. 283,707. Patented Aug. 21, 1883.

Fig. 11.



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(No Model.)

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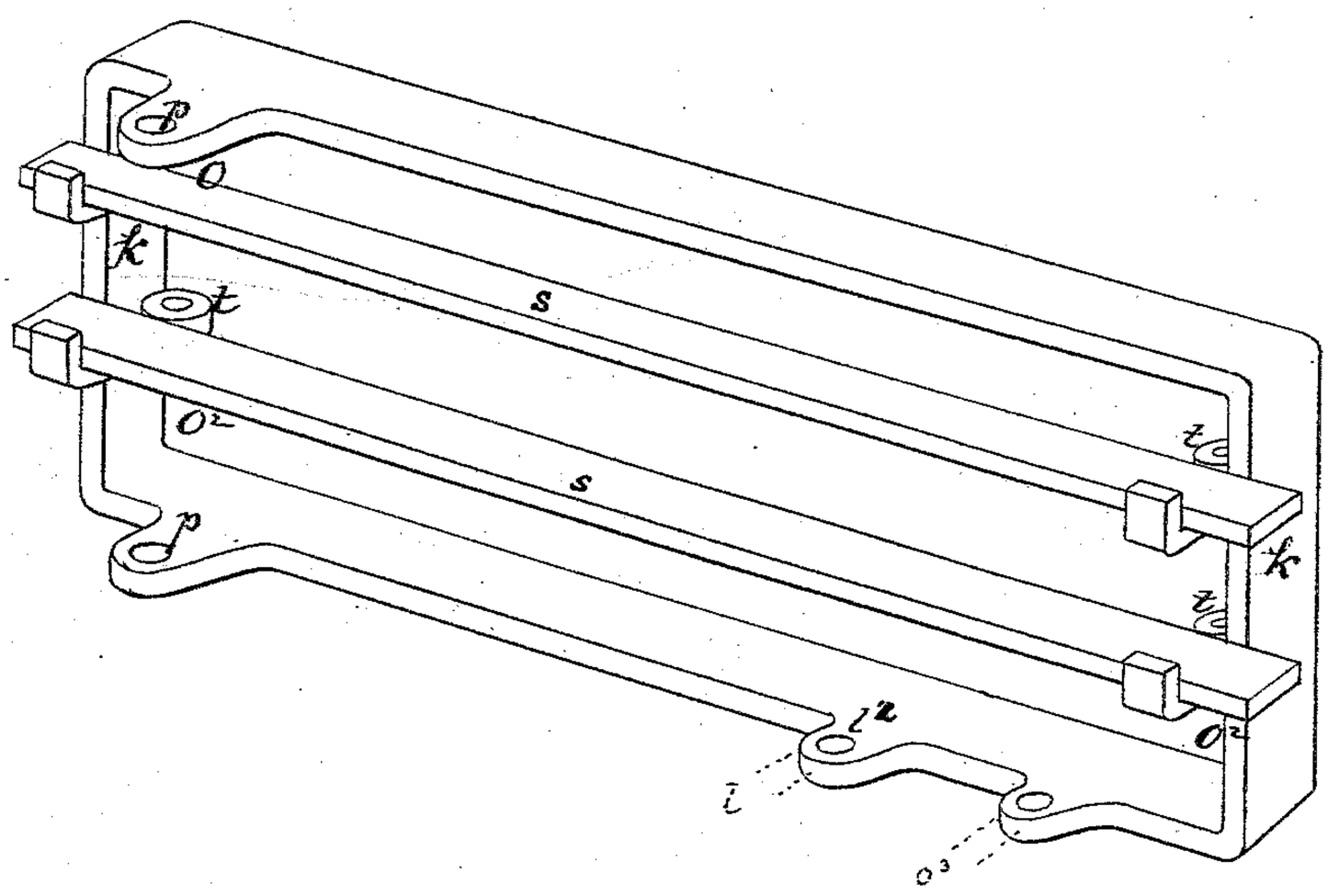
EMBROIDERING MACHINE.

No. 283,707. Patented Aug. 21, 1883.

fig. 12.



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UNITED STATES PATENT OFFICE.

JOSEPH ARNOLD GROEBLI, OF NEW YORK, N. Y., ASSIGNOR TO THE KURSHEEDT MANUFACTURING COMPANY OF NEW YORK.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,707, dated August 21, 1883.

Application filed August 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ARNOLD GROEBLI, of New York, in the county and State of New York, have invented a new and useful Improvement in Embroidering-Machines, of which the following is a specification.

This invention comprises a mechanism for moving the suspended fabric-frame of embroidering-machines automatically in any direction in the same plane, and for performing this movement for every new stitch or series of stitches to be made through the fabric.

My invention comprises new mechanism for moving the frame, and also new mechanism for regulating the direction and extent of the movement.

The first part of the invention consists in connecting the movable fabric-frame with a set of reciprocating slides, which have guides or grooves for transmitting their reciprocating movement by the intermediate mechanism to the frame. These guides are represented as crossing one another, and either one of the slides can move the frame in one direction or in the opposite direction, while the other slide is either stationary or also in motion, and by these slides the fabric-frame is moved in any desired direction and to any desired extent within the limits provided for its movement.

The invention consists, secondly, in the mechanism for moving the aforementioned slides according to the requirements of the pattern. To this end Jacquard needles are employed to lift hooks, which, when lifted, are actuated by levers, and impel beams, which cause the slides to be moved in the desired direction.

The third part of my invention relates to the means for connecting said slides with said beams; and it consists of certain racks, pinions, and screws, and other devices for automatically controlling the motion of the slides, as prescribed by the pattern on the Jacquard card, according to the requirements of the pattern to be produced. The extent of motion of the beams is regulated by the pattern-card, which, by elevating any one of the Jacquard needles, lifts the corresponding hook, and thus causes it to be engaged with a lever which operates so as to give a greater stroke to the hooks at one side of the machine than to those at the other side, all as will hereinafter be more fully described. Necessarily, therefore, the invention consists, furthermore, in many details of improvement, that will be hereinafter more fully specified.

In the accompanying drawings, Figure 1 represents a face view of the fabric-frame, showing how the same may be connected with the slides. Fig. 1^a is a detail face view of the grooved guides. Fig. 2 is a plan or top view of the main mechanism. Figs. 2^a, 2^b, and 2^c are detail views of parts of the mechanism employed for controlling the position of the racks. Fig. 3 is a side elevation of the mechanism which is shown in plan in Fig. 2. Fig. 3^a is a detail sectional view of part of one of said slides where its nut engages with the screw. Fig. 4 is a rear elevation, partly in section, showing the pattern-prism and the Jacquard needles. Fig. 5 is a top view of the hooks, which are controlled by the needles of the Jacquard mechanism. Fig. 6 is a side view, partly in section, showing the hooks and their connection with the levers and with the needles that lift the hooks. Fig. 7, Sheet 2, is a detail plan view, showing the mechanism for locking the screws. Fig. 8 is an enlarged side view of the mechanism for shifting or setting the racks; Fig. 9, a side view of part of said mechanism. Fig. 10 is a side view of the upper part of the machine seen from the opposite side of Fig. 3. Fig. 11 is an enlarged top view, partly in section, of the rack-shifting mechanism. Fig. 12 is a perspective view of the frame containing the levers O and O^2.

The letter A, Fig. 1, represents the fabric-frame of an embroidering-machine. This frame is suspended, either by means of weighted levers B, as shown, or otherwise supported in a stationary framing, C, so as to be capable of a certain amount of movement in any direction in the plane of its face, but not otherwise. The frame A is connected by a rod, D, or series of rods, with studs *a b*. (See Fig. 3.) These studs *a b* carry two heads, a^2 and b^2. The head a^2 engages with a guide, a^3, attached rigidly to a slide, E, and the head *b* engages with a guide, b^3, attached rigidly to a slide, F. The guides depicted in the drawings are grooved; but they may be tongued, or may have rods on which the heads may slide. The two guides a^3 and b^3 are represented as diago-

nal to the direction of the bar D and at right angles with one another, which is their most advantageous relative arrangement. The result of this peculiar arrangement of engaging the studs *a b* with the two slides E F, that have the guides, is that if one of the slides only is moved up the studs obliged to be in those parts of the guides which overlap will move in the direction of the guide in the other of said slides, and, with them, the fabric-frame. Thus, if the slide E be raised, the result will be that the frame A will move upward to the left; but when the slide F is raised the frame A will move upward to the right. When the slide E is lowered, the frame A will move downward to the right, and when the slide F is lowered the frame A will move downward to the left. Consequently by moving either one of said slides only the fabric-frame will receive a motion upward or downward, and to the right or left, as may be desired; but when both of the slides are moved simultaneously upward the same distance the frame A will be simply raised, and in like manner the same will be only lowered if both slides are moved downward simultaneously. A complete horizontal motion can be obtained by raising one of the slides and lowering the other at the same time and to the same extent, and thus it will be perceived that by regulating the motions of the two slides E F, so as to move either one only in one direction, or both in the same direction to the same extent or to varying distances, or both in opposite directions to the same extent or to varying distances, every imaginable direction of movement can be imparted to the frame A. The said frame can thus be adjusted to present to the embroidering-needle after every stitch any particular part of the fabric which it may be desired to have pierced by a new stitch. The studs *a b* may not be connected to the same rod D; but each stud may have a separate connection by rods or levers, or both, with the fabric-frame. Each of the slides E F is guided vertically in a stationary framing. Thus the slide E is guided in the stationary framing E^2 and the slide F in the stationary framing F^2, and in these stationary frames the said slides may either be dovetailed, as indicated in Fig. 2, or rabbeted, or otherwise properly guided.

It is clear that although I have described the one branch of my invention—namely, that branch which relates to the manner in which the frame A is moved in the desired direction and to the desired extent—as applicable to a frame that is vertically suspended, (in which case the slides E and F receive a vertical motion,) nevertheless it is clear that the principle of the invention, as far as described, is also applicable to a fabric-frame which is suspended or supported in another than a vertical position—in fact, it is applicable to a horizontally-placed fabric-frame; or the frame may move in an intermediate direction between the horizontal and vertical without requiring additional invention, if such a direction of motion should be preferred. I also desire it to be understood that it is not necessary that the slide E should move in a parallel direction with the slide F—that is to say, vertically, if the slide F moves vertically—as I find that the effect upon the frame A can be fully attained, even if one of the slides (say the slide E) moves horizontally, while the other slide moves vertically, or vice versa, and so far as this feature of the invention is concerned I desire it to be understood that it is not limited to the mechanism which shall hereinafter be described as the best mechanism for moving said slides, as the desired result can be obtained, perhaps in an inferior manner, by joining the two slides E F with mechanism other than that with which they are represented as connected. The slide E can be moved up and down by means of a screw, G, and the slide F by means of a screw, H. The spindles of both these screws are hung in fixed bearings. The nuts for these screws are set into the upper parts of said slides, respectively, or in any other part thereof, and are by preference each made in two parts, as indicated in the diagram Fig. 3^a, so that if the thread of the nut or screw should wear, the slack may be taken up by bringing the two parts of which the nut is composed closer together, and then reuniting them by means of small bolts or screws. The screws G and H have their bearings in the general frame-work of the machine, and are not capable of up and down motion, only being intended to rotate. The one screw, G, carries a pinion, *g*, and the other screw, H, carries a pinion, *h*, the two pinions being in different planes and engaging, respectively, with toothed racks I and J. Each of these racks is a double rack, as indicated in Figs. 2 and 11, but of such width that only one of its rows of teeth can at any one time gear into the teeth of the pinion to which such rack pertains. The double rack I is securely jointed to a transverse beam, L, and the double rack J is in like manner jointed to a transverse beam, M, the beam M being above the beam L, as shown in Fig. 3. It follows from what has been said that by moving the beam L in a horizontal plane the rack I can be moved and the screw G thereby turned, and that by moving the beam M in a horizontal plane the rack J can be moved, and the screw H thereby turned.

It remains to show how the beams L and M are set in motion, and how the racks I and J are adjusted to reverse the rotation of their respective screws. Referring to Figs. 5 and 6 it will be seen that the beam M is above a series of "hooks" N, and that projections *i* of those hooks engage the outer face of said beam. One of these hooks N is in Fig. 6 shown to be raised, so as to bring another projection, *j*, on it into the path of a lever, O, and this lever, when moved in the direction of the arrow shown in Fig. 2, will pull the hook N in the same direction, and thereby draw the beam M, and thus move the rack J; but when neither of the hooks is lifted into the path of the lever, as

shown in the lower part of Fig. 6, so that the said lever, when moved, will not find any shoulder *j* in its path, then the beam will remain stationary. Whatever has been said with reference to the hook N and lever O as applied to the beam M applies likewise to the beam L, which is in Fig. 6 shown to be in contact with the projection i^2 of a hook, N^2, which in turn is capable of being taken hold of by a lever, O^2, when the same is in line with a shoulder, j^2.

Fig. 5 shows a portion of the beam M above a series of hooks, N, there being a large number of hooks beneath each of the beams, and each of these hooks is engaged with one of the needles P of the Jacquard mechanism. These needles P are suspended above the card Q^2, which is placed over the Jacquard prism Q. This card is intended to be so arranged that it will allow the majority of the needles P to pass through apertures therein; but that particular one or more of the needles, (for in this construction I prefer to move each beam by just one needle at a time,) is encountered by a solid part of the card, and will thereby be raised, and will cause one of the hooks N or N^2 to be lifted into the path of the corresponding lever O or O^2. The prism, with the card thereon, is moved bodily down out of the way of all needles, is then turned, and then raised again to lift some of the needles or solid parts of the cards. The other needles are not raised, but enter the holes of the cards and prism. The raising, lowering, and turning of the prism are well-known movements, obtained by well-known means, and need not here be further described.

Instead of having the needles P work on the prism Q, so that they pass through the holes in the card, excepting the needle which is to raise one of the hooks, the mechanism can readily be so arranged that the hook-actuating needles pass through apertures of the card, leaving the other needle or needles on the solid part of the card.

The levers O and O^2 receive a constant oscillating motion by suitable mechanism. Thus in Figs. 3, 10, and 12 the two levers O and O^2 are shown to be united by a framing, *k*, which is pivoted at l^2 to a slide, *l*, that is connected by a rod, *m*, with a crank, *n*, that is rotated in the direction of the arrow with the shaft *o*, which shaft, by suitable gearing, receives its motion from the driving-shaft R of the machine. The levers O and O^2 have their fulcra at *p*, (see Fig. 2,) and are moved by the framing *k*, which connects with the slide *l* pivotally at l^2, so that the levers have a motion around the fulcrum *p*, back and forth. In other words, they get a circular reciprocating movement by connection with the rectilinearly-reciprocating slide *l*.

The several hooks N (I will now speak of the hooks N, because all I say with reference to them and their appurtenances applies equally well to the hooks N^2) have their shoulders *j* represented at varying distances from their shoulders *i* and from their points of connection with the needles P, and Fig. 5 shows clearly that these shoulders *j*, in the normal position of the hooks, are placed parallel to the normal position of the lever O when the same is at the beginning of its stroke, and from this it will be perfectly plain that when a particular hook of the series is lifted by its needle P, so as to carry its shoulder *j* into the path of the lever O, the extent of movement imparted to said hook, and thereby to the beam M, will depend upon the particular hook that is lifted, for it is plain that, looking at Fig. 5, if the hook which is farthest to the right of that figure be raised, it will receive a far greater motion by the lever O than the hook at the left of that figure, because the latter is nearer to the fulcrum of the lever than the former, and thus it is also clear that by this system of needles and hooks I can from the lever O, with its definite and invariable movement, obtain strokes of greater or less extent for the rack J and screw H, or leave said rack and screw entirely unaffected. The same remarks apply to the lower hooks, N^2, beam L, rack I, and screw G. Each lever O may be a simple lever; but I found that in practice it is better to make it with a sliding face, so as to avoid undue friction between it and the hooks that are effected by it, for the lever moving in an arc, and the hooks moving in a straight line, will have a tendency to cramp on each other, which it is desirable to overcome. To this end I have provided the lever O (and also the lever O^2) with a sliding face, *s*, which is parallel with the lever, and held in brackets that project from the framing *k*, and which bears against suitable friction-rollers, *t*, that are carried by the framing *k*, so that, although sharing in the oscillations of the lever, this slide *s* will have an independent sliding motion in the direction of its length, and will thus accommodate itself to the contact with the hook while moving the same.

The shoulders *j*, instead of being at varying distances from the beam M, may be in a line parallel therewith, in which case the normal position of the lever O will also be parallel with the face of beam M.

Any kind of lever or series of levers for moving the hooks N can be employed. The beam M, when drawn in one direction by the lever O acting on one of the hooks N—that is to say, toward the needles P—draws the rack J in the same direction, of course, and after the lever O has completed its stroke in that direction the beam M can be brought back to its normal position either by suitable weights, W^7, Fig. 6, or by a spring or other suitable mechanism.

In order to guide the beam M during its reciprocating motion and cause it to maintain its direction, I prefer to provide it with an idle-shaft, v^2, carrying pinions *v*, which engage into stationary racks *u*, whereby, as the said pinions are alike, the steadiness of motion will be insured.

It remains to describe how each of the racks I and J is shifted laterally to turn its screw in the desired direction, and here it is proper to state that the screw is only to be turned by the positive motion of the lever O toward the needles P, and is to remain stationary while said lever makes its back-stroke away from the needles; hence the mechanism for controlling the rack must be such that during the back-stroke of the lever O and beam M the rack will be entirely out of gear, and during the forward motion of the lever the rack will or may be in gear on that side which it is desired to have in gear; hence as the position of the rack must be predetermined for the purpose of the pattern to be produced it follows that the Jacquard prism and needles are utilized also for the purpose of adjusting the racks laterally.

I will now describe how the rack J is to be controlled. The same description applies to the manner of controlling the rack I. At that part where the rack J embraces the pinion *h* of the screw H it is in turn embraced by a box, *w*, which is a framing with vertical shoulders that embrace the outer sides of the rack, so that when said framing is moved laterally the rack will have to follow. This box *w* is swiveled to the short arm, *x*, of an elbow-lever, S, which elbow-lever has its fulcrum at *y*, at the junction of its long and short arm. The long arm of this elbow-lever S (see Figs. 2 and 11) is between two springs, d^3 and e^3, which, if not interfered with, as hereinafter stated, will balance it, so as to hold it in the normal position shown in Figs. 2 and 11, and thereby hold the rack in the position where it will not engage with the pinion of the screw. The two springs just named bear at their outer ends against levers T and U, respectively. The lever T has its fulcrum at f^3, and connects on the same fulcrum by a clutch-shoulder (see diagram Fig. 2^c) with a link or lever, g^3, that connects with a jointed rod, h^3, which in turn connects with the lever O. The lever U has its fulcrum at i^3, and joins by a clutch mechanism, similar to that shown in Fig. 2^c, a link or lever, j^3, which also connects to said rod h^3. The clutches are of such character that they cause the links or levers g^3 and j^3 to affect the positions of the levers T and U only during the working-stroke of the lever O. When one of these levers is so moved, it will compress the spring d^3 or e^3 next to it, and thereby deflect the lever S; but although both links g^3 and j^3 are always moved together, only that one will engage its lever T U which finds said lever held by the catch, hereinafter described, in an oblique or tilted position. During the forward or working stroke of the lever O the lever S will be maintained in the deflected position by a pawl or catch-piece, n^3, which will drop against its side, (see Figs. 2^a and 2^b,) no matter whether the lever S be swung to one side or the other, and which will not be lifted out of the way of the said lever until at the end of the working stroke of the lever O, when a slide, o^3, which connects with said lever O, will carry a shoulder or projecting stop, o^4, against a projecting arm, x^4, of the spindle w^4, which carries the pawl n^3, Figs. 9 and 10, and move such pawl out of the path of the elbow-lever S, allowing the latter to be rebalanced, which it must be, at the end of the working stroke of the lever O, for now, and during the entire backward stroke of said lever and of the beam M, the rack J must be out of contact with the pinion *h*, so that during such backward stroke the embroidering-needle will find the frame A stationary, and during this backward stroke the long arm of the elbow-lever S will be balanced between the two springs d^3 and e^3; and when the lever O makes its movement in the direction of the arrow shown in Fig. 2 the rod h^3 will be pulled and the links or levers g^3 and j^3 swung on their pivots, so as to cause them to slightly move whichever of said levers T and U is out of its transverse position, and thus compress the corresponding spring, d^3 or e^3. The Jacquard needles p^2, placed over the end of the card, will move one of two elbow-levers, Q^{12}, (see Fig. 8,) which will move one of two slides, R^2 and S^2, for each beam, the slide R^2 engaged by an L-shaped slot with a projection from a pawl, l^3, and the slide S^2 in like manner with a pawl, m^3. These pawls bear against the levers T and U, respectively. That one of the slides R^2 S^2 which is moved in the direction of the arrow 6, Fig. 8, by the lifting of its Jacquard needles p^2 will swing and move its pawl off the lever T or U, whichever it be, so as to release the corresponding spring, d^3 or e^3, whichever it be, from pressure, without disturbing the other spring, and then the long arm of the elbow-lever S will be subjected to pressure from one side only, and will move the box *w* laterally in one direction, and thus carry the rack into contact with the desired side of the pinion. All this will take place prior to the beginning of the working stroke of the lever O, so that during that stroke the rack will be properly engaged. After the slide R^2 or S^2 has moved its pawl l^3 or m^3, as just stated, said slide receives a slight upward thrust by a vertically-lifted rod, R^4, which stands on an elbow, S^4, that is swung on its pivot t^4 by a rotating crank, c^4, on the shaft O, (see Figs. 9 and 10,) and thereby brings the engaging-pin of the pawl that projects through the L-shaped slot into line with the horizontal part of said slot, thereby giving a suitable torsional spring, u^4, on the spindle on which the pawl swings, an opportunity of throwing the pawl into the normal position, where it will again stop the lever T or U, whichever it be, as soon as such lever is again brought into its normal position by the action of the rod h^3 on the links g^3 and j^3.

In Fig. 7 is shown the mechanism for locking the two screws G and H and fixing them in position at the end of each forward stroke of the levers O O^2. This mechanism consists of two pawls, p^3 and q^3, which are placed in such proximity to the pinions *g* and *h* of the

screws G and H, respectively, that they can be thrown against the peripheries of said pinions. Both of these pawls are joined to a lever, X, whose fulcrum is on the pin *y*, which may be the same pin on which the levers S loosely hang and vibrate. The lever X abuts against a click, r^3, which is directly in line with the pawl or catch-piece n^3, and mounted upon the same spindle w^4 as the last-mentioned pawl, so that the pawls n^3 and r^3 will move simultaneously under the influence of the slide o^3, already referred to, and of the slides R^2 and S^2, as described. The lever X is between two springs or cushions, s^3 and t^3, both of which are subjected to the action of the movable link j^3. This link j^3 carries an arm, w^3, which has an arm or extension, w^3. This arm w^3 has two shoulders—one at each end—bearing against the springs s^3 and t^3, respectively, at their outer ends. When the lever O is moved in the direction of the arrow shown in Fig. 2, the outer end of the link j^3 will be moved in the direction of the arrow shown in Fig. 7, so as to thereby compress the spring t^3 and release pressure on the spring s^3. At this time—that is to say, when the lever O begins to move in the direction stated—the lever X is in the position indicated by dotted lines in Fig. 7, and holds the two pawls p^3 and q^3 away from the toothed wheels *g* and *h*, respectively. In the dotted position shown in Fig. 7 the lever X is held by the pawl r^3; but, nevertheless, it is subjected to greater pressure from the spring on one side than from that on the other. As soon as the lever O completes its stroke, and the slide o^3 strikes the pin x^4 on the spindle w^4 of the pawl n^3, so as to throw the racks out of gear, as hereinbefore specified, the pawl r^3 is also lifted off the lever X, and the said lever X thereby brought under the influence of the overpowering-spring t^3 and deflected into the position which is shown by full lines in Fig. 7, thereby throwing the pawls p^3 and q^3 into the toothed wheels *g* and *h*, and locking the screws in the manner stated. This mechanism, or equivalent mechanism, for positively securing the screws against all motion after the lever O has completed its working-stroke renders the position of the frame A absolutely fixed, and insures great certainty of reaching the prescribed design in embroidering. It also insures securing to each screw a rotary movement of one tooth of its pinion or a multiple thereof. If by some defect in the mechanism a screw should not be turned the very exact extent required, the locking-click p^3 or q^3 will insure the final position to be precisely as required. Were it not for such mechanism for locking the screws the position of the frame A might be disturbed accidentally, and thus the design intended to be produced would be more or less marred.

I do not wish to be limited in regard to the locking of the screws to the particular pawl-and-lever mechanism which I have described, as other means well known to mechanics might be substituted for pawls—such as break-straps, or the like. The slides R^2 and S^2 connect likewise with the spindle w^4 of the pawls r^3, so as to lift said pawl off the lever X just before the beginning of every working stroke of the lever O. Whenever the pawl r^3 has been moved, either by the slide o^3 or by one of the slides R^2 or S^2, it immediately thereafter falls back into its normal position under the influence of a suitable weight or of a spring, as z^4. The slides R^2 and S^2 are engaged by an L-shaped slot with a pin, y^4, that projects from the spindle w^4, so that whenever either of said slides is drawn by its bell-crank Q^{12} it will act not only on its pawl l^3 or m^3, but also on the pawl r^3, and then, when such slide R^2 or S^2 is lifted by R^4, the pins y^4 will come into the lower horizontal part of the L-shaped slot and allow the spring z^4 to throw the spindle w^4 and pawl r^3 back to their normal positions.

The card Q^2, being adapted to work on two sets of needles, is shown in Fig. 6 to be so constructed as to present two jointed sections, a^6 b^6, to each face of the prism Q. In other words, instead of making each separate section of card as wide as the face of the prism I make it half as wide only. This will bring one section under one set of needles and the other section of the card under the other set of needles. The advantage of this division is that a far less number of sections of card will be required in a shop for producing numerous varying combinations and designs, as the same half-cards can be used for different designs, where entire cards having double rows of holes could not be employed.

I claim—

1. The slide E, having guide a^3, combined with the slide F, having guide b^3, and combined further with the fabric-frame and its connection D and studs *a b*, for operation substantially as described.

2. The slide E, combined with the screw G, rack I, beam L, hooks N^2, lever O^2, and needles P, substantially as described.

3. The combination of the fabric-frame with a pair of reciprocating guides, for operation substantially as herein shown and described.

4. In Jacquard mechanism for regulating the position of the fabric-frame of an embroidering-machine, the combination of Jacquard needles P with series of hooks N, which are engaged by said needles, and which have shoulders or contact-faces *j* at varying distances from the beam M they draw, and with the actuating-lever O, which is adapted to engage that one of said hooks which is lifted into its path, and with said beam M, substantially as described.

5. In Jacquard mechanism, the combination of the hooks N and needles P with the actuating-lever O, moving on a fulcrum and adapted to impart different degrees of motion to the several hooks, substantially as specified.

6. The combination of the fabric-frame with two guides, two slides carrying said guides, two sets of Jacquard needles, and intermediate mechanism between said needles and said

slides, substantially as herein shown and described.

7. The lever O, combined with the hooks N and with needles P, sliding face-piece *s*, and friction-rollers *t*, substantially as specified.

8. The hooks N N, each having projection *i* and projection *j*, combined with the beam M, and with the oscillating lever O, and with the needles P, all arranged so that the projections *i* shall always be in the rear of the beam M, but only those projections *j* will be in the path of the lever O which are on the hooks N raised by the needles, substantially as specified.

9. The toothed rack J, combined with the box *w*, bell-crank lever S, levers T U, springs d^3 and e^3, and with mechanism, substantially as described, for moving said levers S, T, and U, as specified.

10. The beam M, combined with rack J and with the slide F, and with intermediate mechanism, substantially as described, for connecting said beam with said slide during one movement of said beam and disconnecting them during the other movement of said beam, substantially as specified.

11. The lever O, combined with the parts h^3, g^3, and j^3, levers T U, springs d^3 and e^3, lever S, box *w*, rack J, and with the slides R^2 S^2, pawls l^3 and m^3, and device for moving said slides, substantially as described.

12. In machinery for moving the fabric-frame of an embroidering-machine, the combination of said frame with two slides having guides with screws for moving said slides, with racks for turning said screws, and with mechanism, substantially as described, for imparting motion to said racks, and with mechanism, substantially as described, for adjusting the position laterally of each of said racks, all as and for the purpose specified.

13. The combination of the screws G H and their actuating-pinions *g h* with the pawls p^3 and q^3, lever X, springs s^3 and t^3, and pawl r^3, and with mechanism, substantially as described, for moving said pawl and for alternately compressing said springs, as specified.

14. In machinery for moving the fabric-frame of an embroidering-machine, the combination of said frame with slides having guides, with screws for moving said slides, racks for turning said screws, and with mechanism, substantially as described, for locking and determining the position of said screws after every movement of the racks has been completed, substantially as specified.

15. The fabric-frame of an embroidering-machine, combined with mechanism, substantially as described, for moving it and for holding it locked after every adjustment, the locking and moving mechanism being substantially as herein shown and described.

16. The beam M, combined with the hooks N, rack J, and screw H, and with mechanism, substantially as described, for disengaging the rack, so as to allow the beam to move back after every working stroke from the screw without disturbing the position of the fabric-frame, as specified.

17. The combination of the beam M with the double rack J, pinion *h*, and screw H, and with mechanism, substantially as described, for shifting said rack laterally and reversing the rotation of the screw, substantially as specified.

18. The combination of the hooks N, their set of needles P, and cards a^6 with the hooks N^2, their set of needles P, and separate cards b^6, and with mechanism, substantially as described, for moving said hooks, and through them the fabric-frame, as set forth.

JOSEPH ARNOLD GROEBLI.

Witnesses:

GUSTAV SCHNEPPÉ,

WILLY G. E. SCHULTZ.