

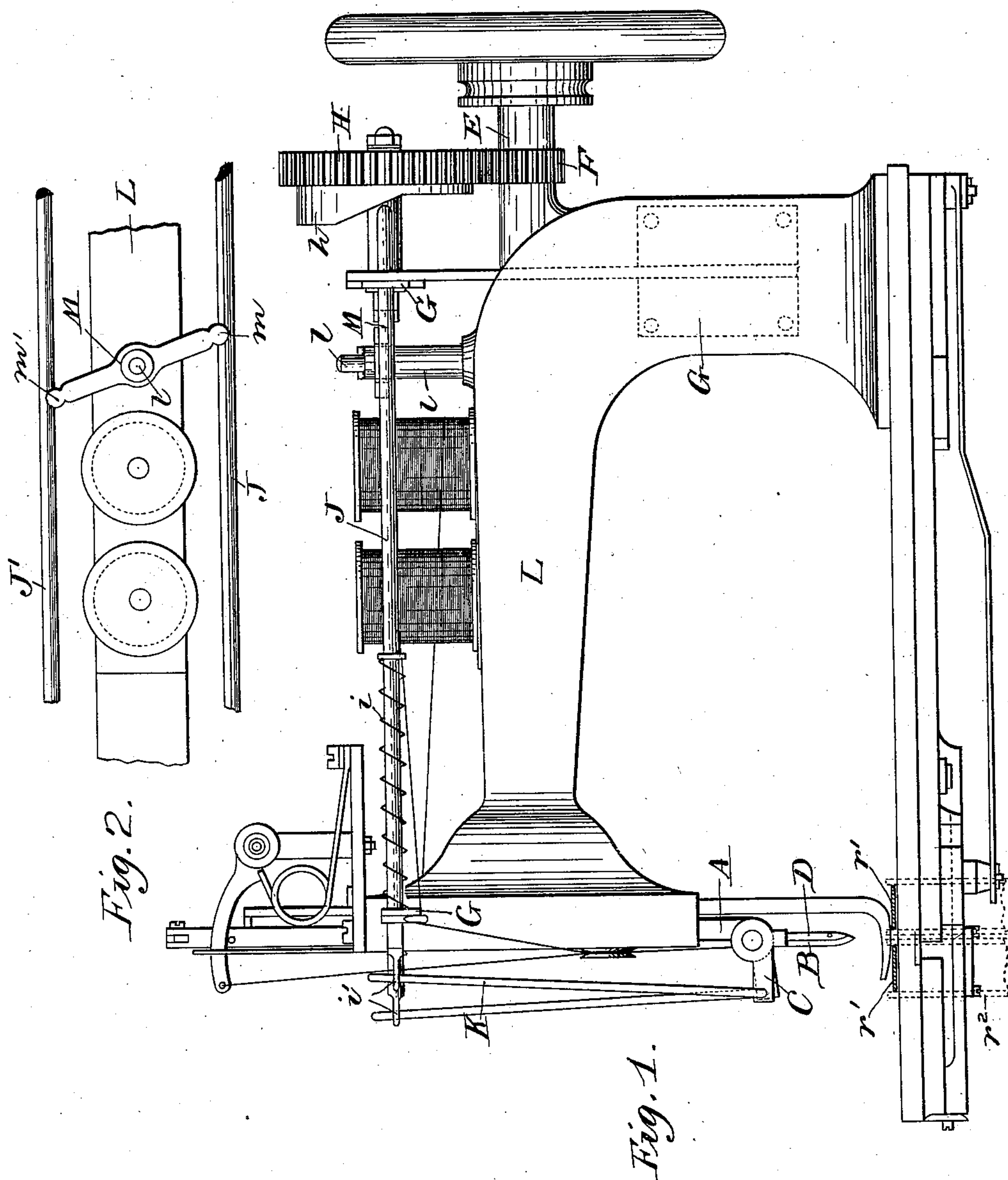
(No Model.)

4 Sheets—Sheet 1.

F. & J. G. GEGAUF.
HEMSTITCH SEWING MACHINE.

No. 592,088.

Patented Oct. 19, 1897.



WITNESSES:

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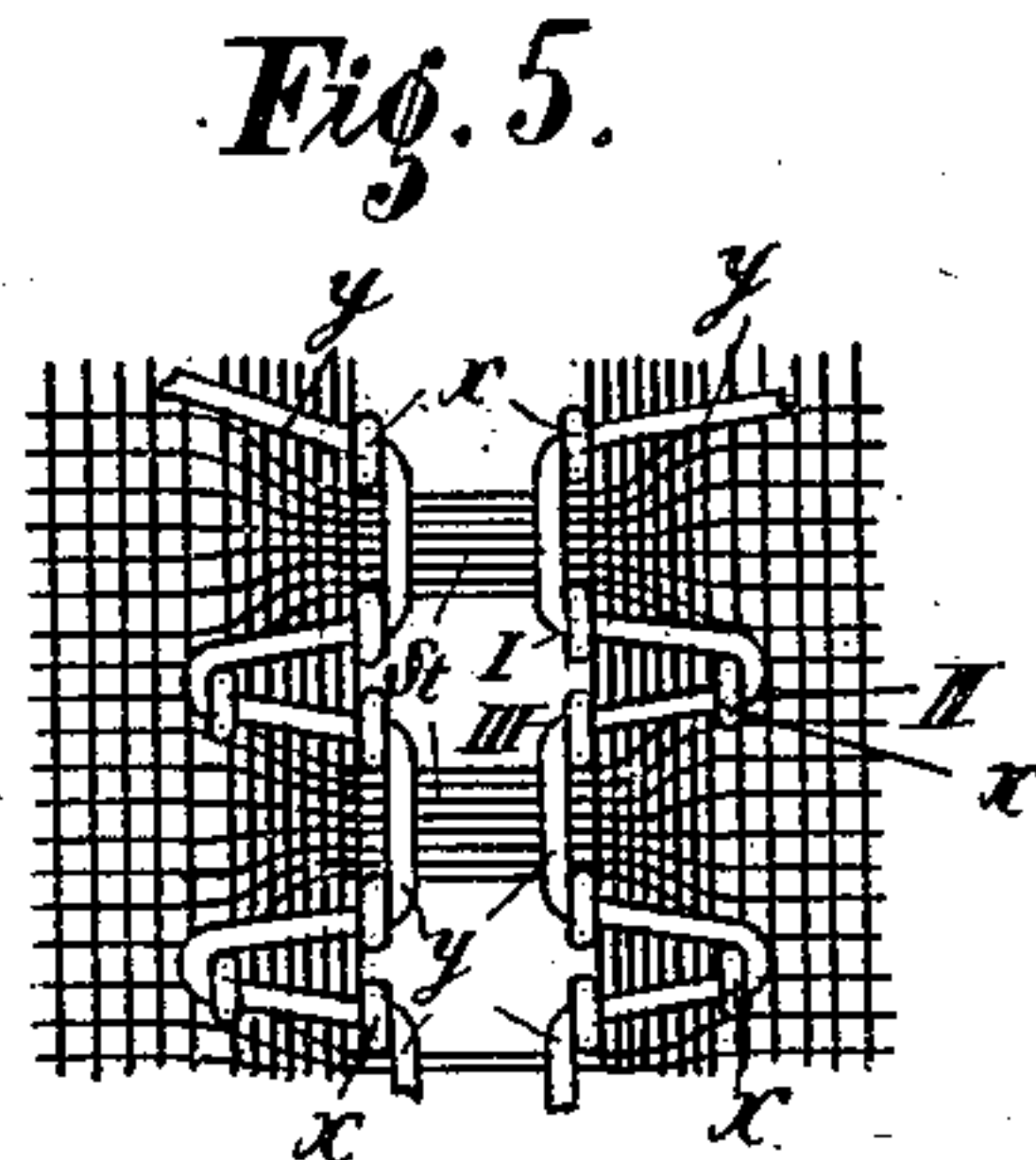
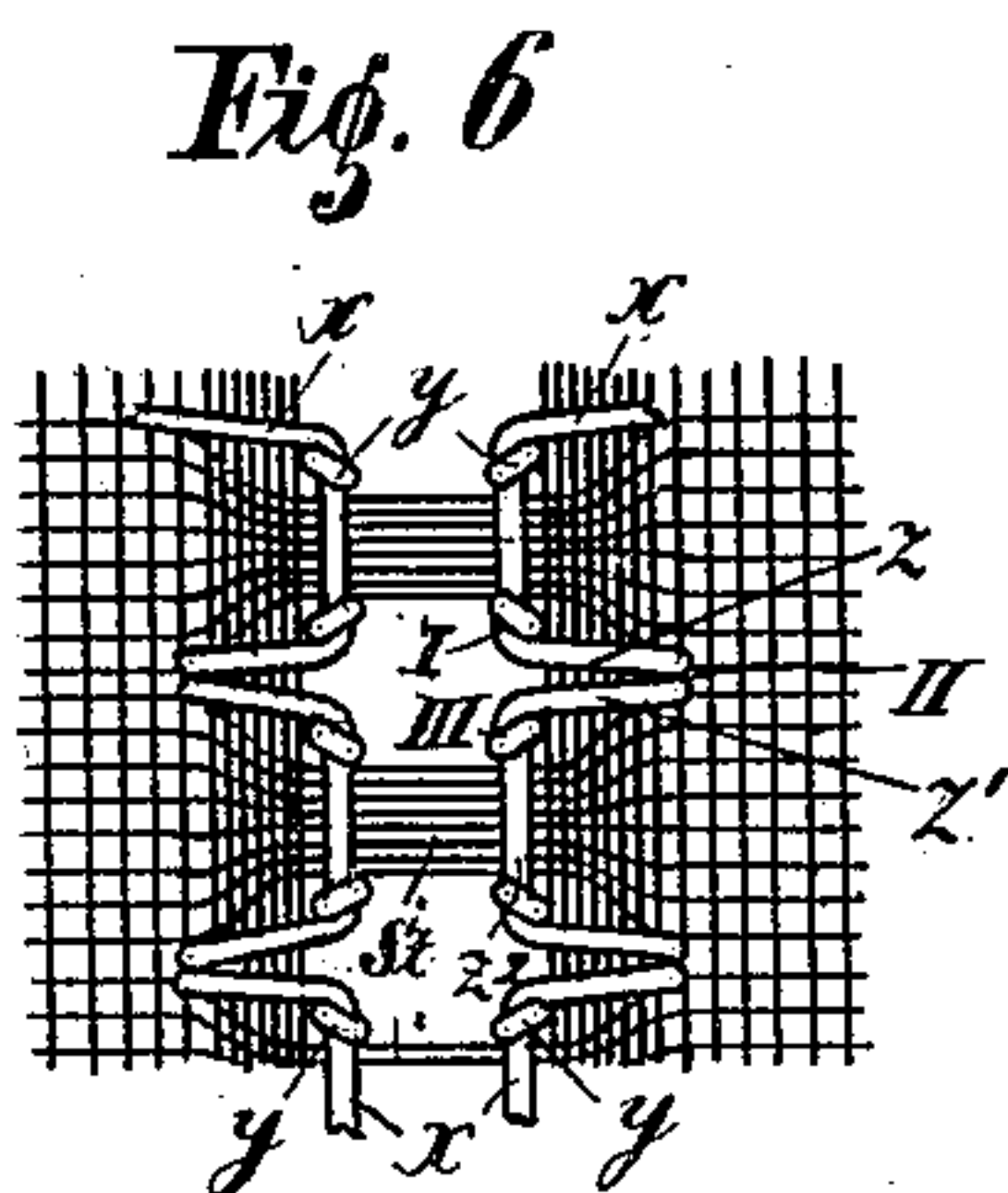
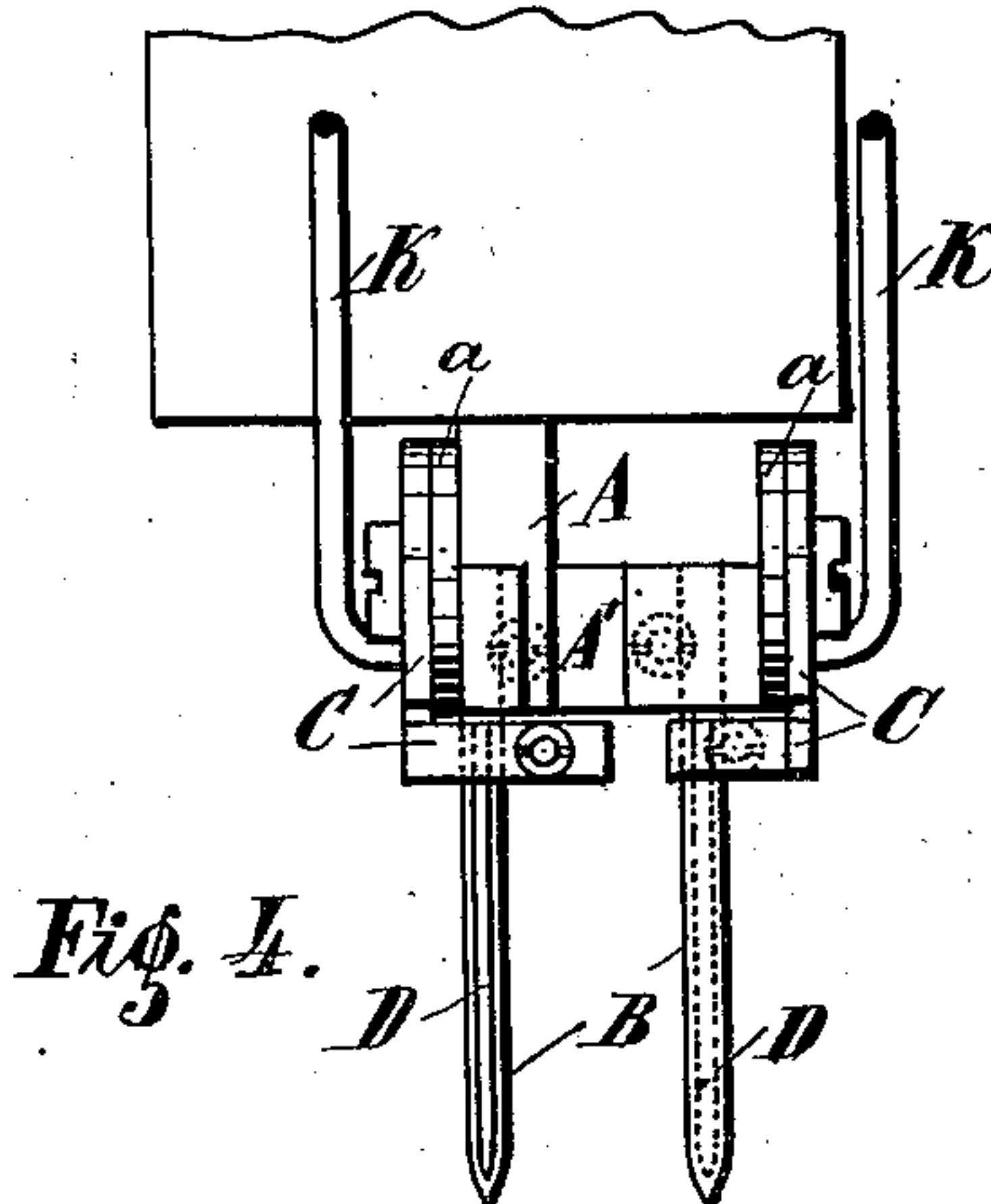
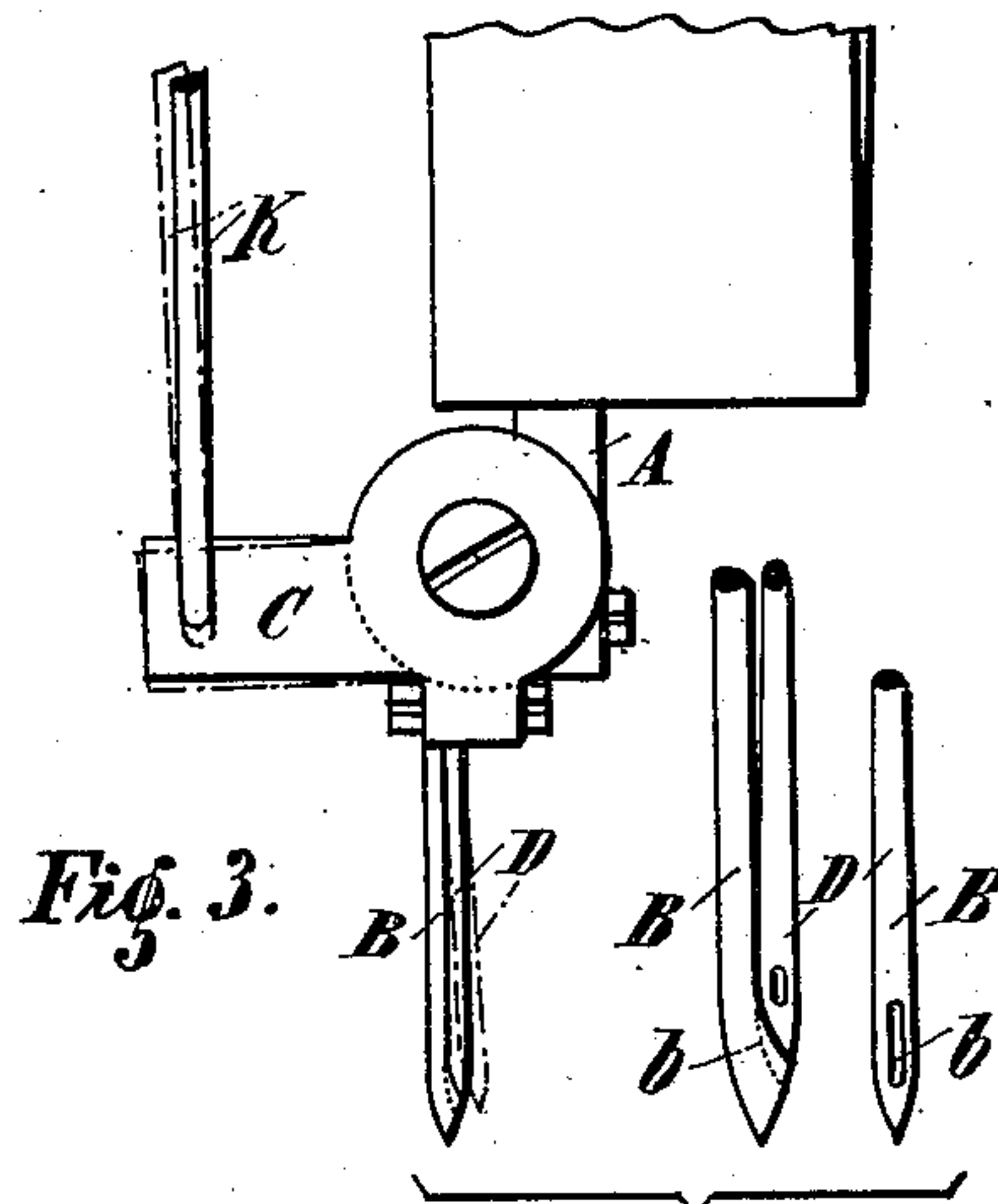
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4 Sheets—Sheet 2.

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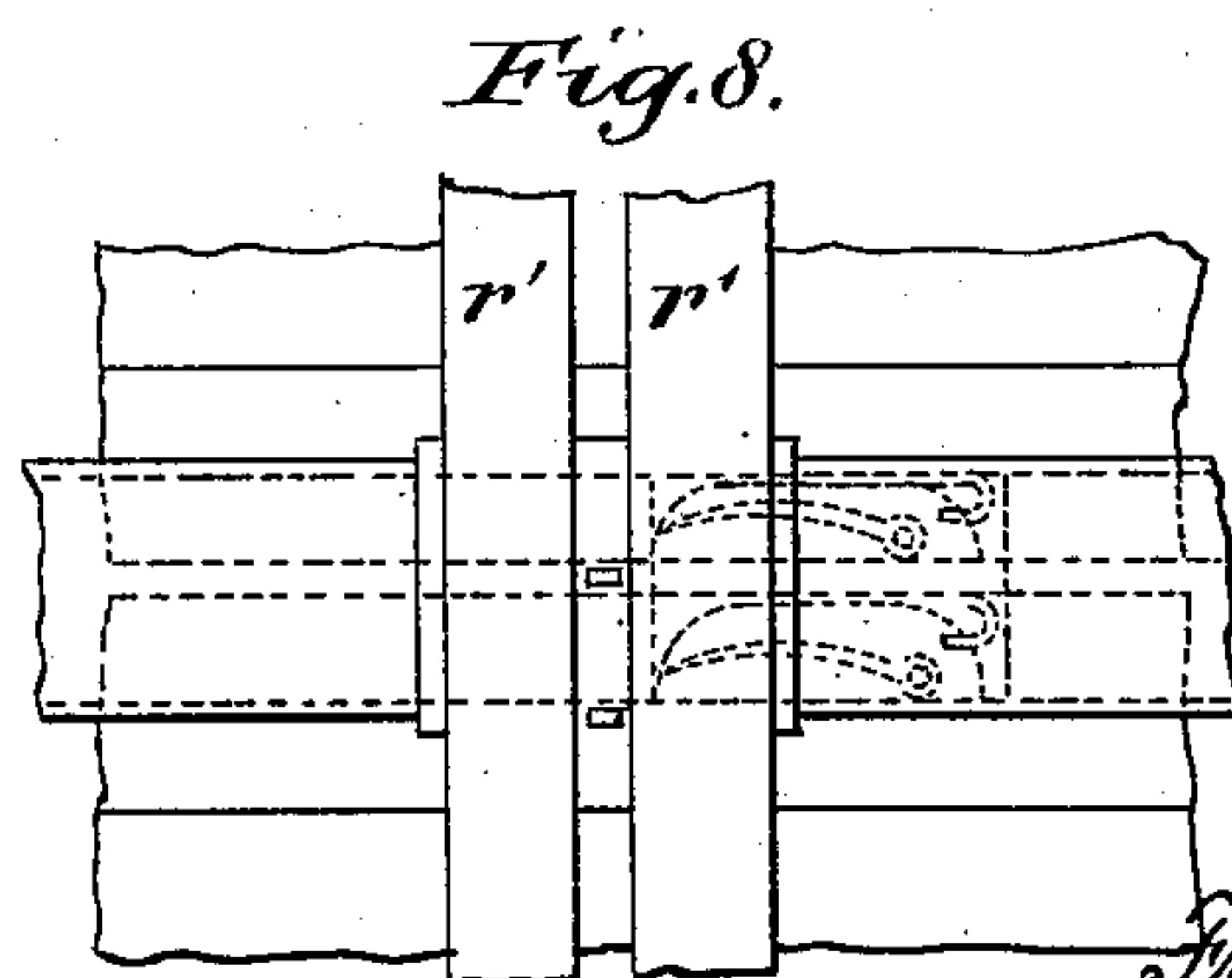
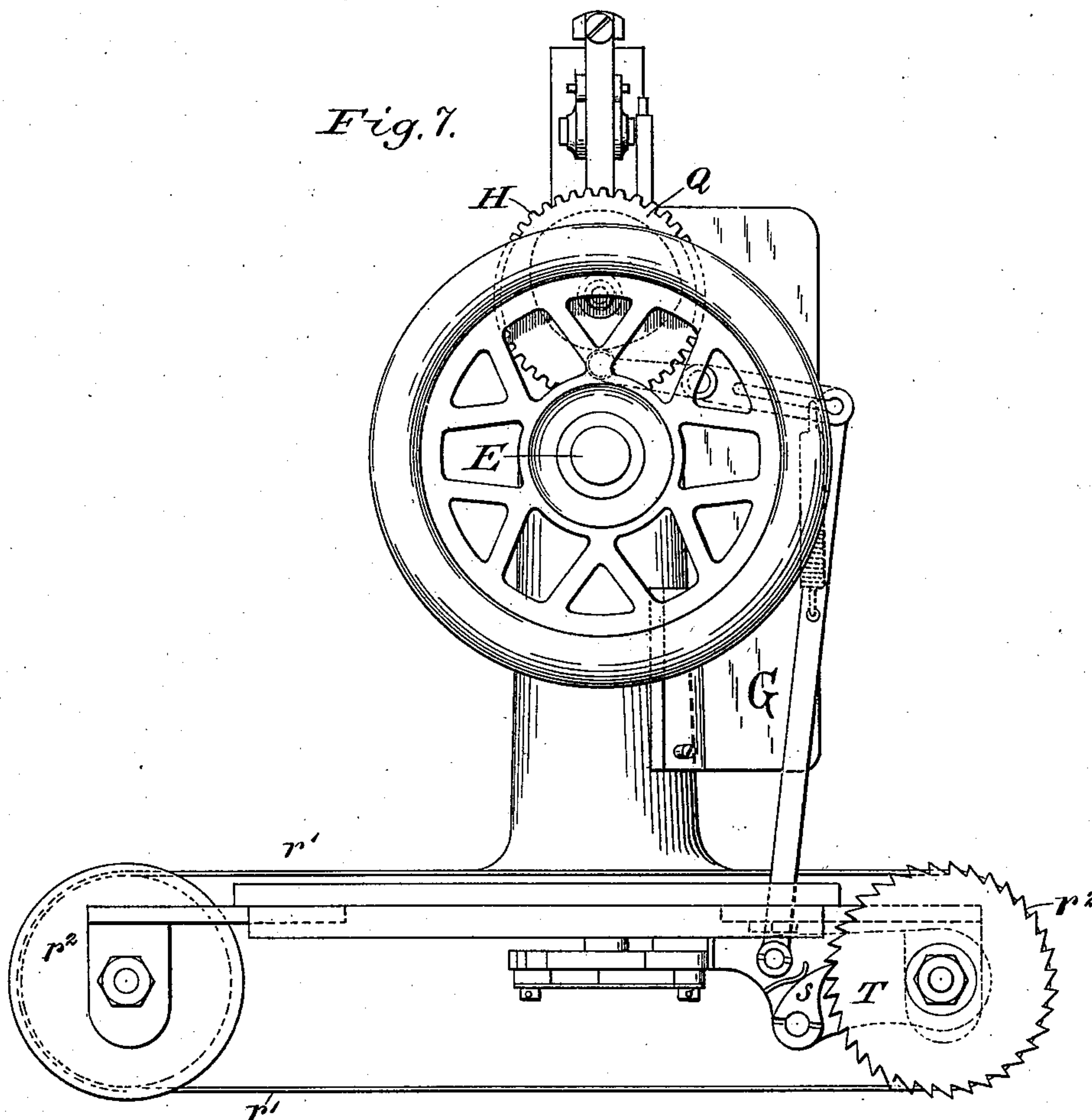
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4 Sheets—Sheet 3

F. & J. G. GEGAUF.
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No. 592,088.

Patented Oct. 19, 1897.



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(No Model.)

4 Sheets—Sheet 4.

F. & J. G. GEGAUF.
HEMSTITCH SEWING MACHINE.

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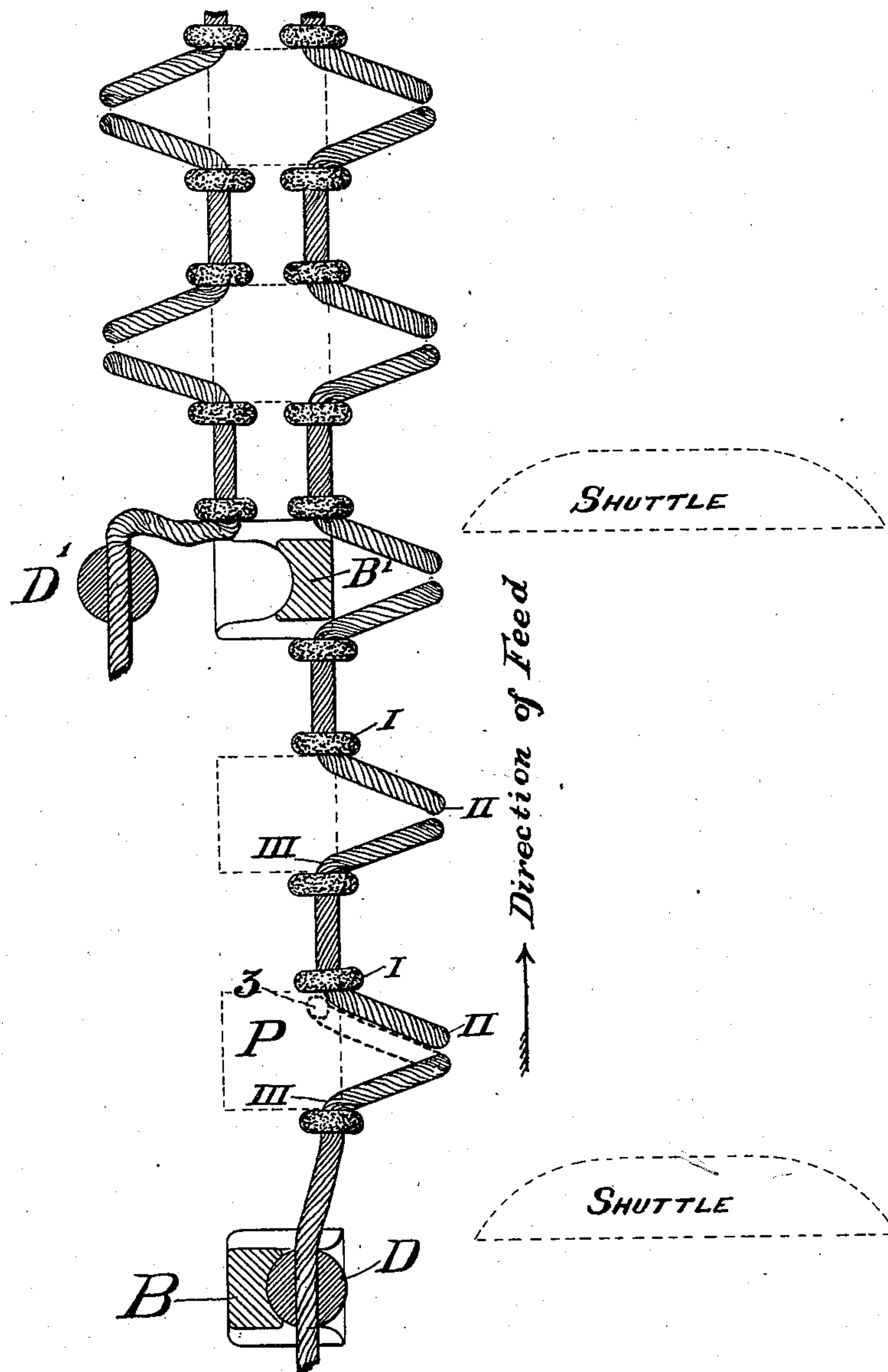


Fig. 9

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UNITED STATES PATENT OFFICE.

FRIEDRICH GEGAUF AND JOHAN GEORG GEGAUF, OF STECKBORN,
SWITZERLAND.

HEMSTITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 592,088, dated October 19, 1897.

Application filed November 28, 1893. Serial No. 492,221. (No model.) Patented in Switzerland September 1, 1893, No. 7,281; in France September 16, 1893, No. 232,867; in Belgium September 29, 1893, No. 106,585; in Germany September 30, 1893, No. 76,076, and in England October 4, 1893, No. 18,565.

To all whom it may concern:

Be it known that we, FRIEDRICH GEGAUF and JOHAN GEORG GEGAUF, citizens of Germany, residing at Steckborn, in the Canton of Thurgau, Switzerland, have invented certain new and useful Improvements in Cross-Hemstitch Sewing-Machines, (for which we have obtained patents in Switzerland, No. 7,281, dated September 1, 1893; in Germany, No. 76,076, dated September 30, 1893; in France, No. 232,867, dated September 16, 1893; in Belgium, No. 106,585, dated September 29, 1893, and in Great Britain, No. 18,565, dated October 4, 1893;) and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our said invention relates to improvements in apparatus or appliances to effect the cross-hemstitch now so generally used in bordering or hemming handkerchiefs and for other purposes and refers especially to a novel arrangement in connection with the needles.

The nature of our invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of the head of a sewing-machine of the usual construction fitted with our improvements and partly in section. Fig. 2 is a plan of a portion of Fig. 1. Fig. 3 is an enlarged view of the needle-bar and needles. Fig. 4 is a side view of Fig. 3. Figs. 5 and 6 are enlarged diagrams of the cross-hemstitch, Fig. 6 showing the stitch on the upper side, and Fig. 5 the stitch on the underside of the fabric. Fig. 7 is an end view of the machine, showing a band feed mechanism. Fig. 8 is a plan view of a portion of Fig. 7. Fig. 9 is a diagrammatic view, on an exaggerated scale, illustrating the formation of the stitches.

Referring at present to Figs. 5 and 6, it will be seen that the stitch is at times thrown to one side. This is effected by causing the needle which carries the thread to swing to one side at the proper times and then to swing back again. The first of the two needles,

which are employed according to our invention, is destined to swing to the right and the second to the left, or vice versa. The manner in which this is done is apparent from an examination of Figs. 1, 3, and 4.

As shown in Figs. 1, 3, and 4, the needle-bar A is formed at its lower end with an arm or projection A'. Fixed to the needle-bar A and its projection A' are two vertical prickers B B, lying in line with each other in the direction of the feed of the fabric. The direction of the feeding motion of the fabric is the usual one—that is, at right angles to the longitudinal axis of the bed-plate of the machine. The space between the prickers B B is a multiple of the space covered by each advance of the feed, so that the second or following pricker will exactly enter one of the holes which has already been made in the cloth by the first or leading pricker. The point of each pricker B is enlarged, as clearly shown in Fig. 3, and is formed with a small pocket b to receive the point of a needle D, which, as will be explained, swings laterally toward and away from the pricker B, as shown in dotted lines in Fig. 3. This is necessary because one needle first forms the stitches on one side of the hem, and the other needle afterwards on the other side of the hem. In the front pricker the needle D is on the right-hand side. In the other or following pricker the needle is on the left-hand side, or vice versa.

The needles D are secured to the oscillating arms C, which are pivoted to the lower end of the needle-bar A, which latter has a lateral projection A', as clearly shown in Figs. 3 and 4. Disks on the arms C bear against similar disks a on the needle-bar and on its projection and help to steady the arms C. The arms C are mounted so as to cause the needles D to swing toward and away from the pricker B at the proper times. The said arms C are operated from the driving-shaft E of the machine.

A pinion F on the spindle E gears into a spur-wheel H, fixed on a stud supported in suitable bearings. The number of teeth on

the wheel F is one-third of the number of teeth on the wheel H, so that the wheel F revolves three times for each revolution of the wheel H.

5 The wheel H has a cam *h* formed on its side and this cam bears upon the end of a rod J, which passes along the top of the machine and is supported in bearings in the brackets G G. A spring *i* keeps the rod J against the
10 cam *h*. As the cam *h* revolves the rod J moves to and fro. Another rod J' lies parallel with the rod J and is reciprocated in opposite directions by a double lever M, pivoted at *l* and connected at *m m'* to the respective
15 rods J J', so that as the first rod J is moved in one direction the other rod J' is moved in the opposite direction.

It will be seen that the ends of the rods J J' are formed with eyes *i'*, which engage with
20 the upper ends of the arms K K, the lower ends of the said arms being secured to the free ends of the arms C. As the cam *h* revolves and it imparts a reciprocating motion to the rods J J', the arms C are thereby cor-
25 respondingly moved and the needles D are caused to swing to the right and to the left of the prickers B, as already described. As the wheel H has three times the number of teeth of the wheel F, the needle-bar A makes three
30 up and down motions, while the needles D make only one oscillation.

We use two shuttles in conjunction with the two prickers and needles. These shuttles are of the ordinary type and appear in dotted lines
35 in Fig. 8. A band feed mechanism is shown in Fig. 7. It has two endless bands *r' r'* running over suitable pulleys *r² r²*, actuated from a cam Q on the shaft of the wheel H by a pawl
40 s, ratchet-wheel T, and intermediate mechanism.

If the stitches shown in Figs. 5 and 6 are considered in conjunction with the foregoing description of the prickers and needles, their formation will now be easily understood. The
45 crossed lines in Figs. 5 and 6 represent the material of the handkerchief or other fabric which is being cross-hemmed. The first or leading pricker and needle form the stitches on the right. The other or following pricker
50 and needle form the stitches on the left. The thread *y* is the shuttle-thread, while the thread *x* is the needle-thread.

First downward stroke of the needle-bar.— Looking at Fig. 6, the first downward stroke
55 of the pricker B is taken when the needle D is lying close against the pricker, as in full lines in Fig. 3, so that only the point of the pricker pricks the fabric, but both the pricker and the needle widen and enlarge the hole.
60 It will be understood that by pricking the fibers of the goods are not cut away, but only pressed aside. The shuttle-thread *y* locks the needle-thread *x* in the usual manner upon the upstroke of the pricker and needle and
65 pulls the needle-thread *x* at the place marked I. On the completion of the upstroke the needle is moved out from the side of the

pricker into the position shown in dotted lines, Fig. 3, by the mechanism hereinbefore described.

Second downward stroke of the needle-bar.— At this downstroke the needle D enters the material apart from the pricker and somewhat to the right, at the point marked II, whereby the side stitch Z is formed. The
75 needle-thread is again locked on the other side of the material by the shuttle-thread, and, on the rise of the pricker and needle, the needle is again moved up against the pricker.

Third downward stroke of the needle-bar.— At this downstroke the pricker and needle are again united in their descent, whereby the side stitch Z' is formed. The shuttle-thread locks the needle-thread upon the up-
85 stroke of the pricker and needle and pulls the needle-thread at the place marked III.

On the completion of the third stroke any suitable and known feed mechanism, such as the band feed mechanism, Figs. 7 and 8, moves the material, which remained at rest
90 during these three downstrokes of the needle-bar, forward to an extent equaling the length of a stitch and lays the stitch which is marked Z² across the fibers *St*. The stitch Z² prevents the fibers of the material pushed
95 aside by the pricker and needle from returning in their normal position, and binds them through the tension of the threads, which tension at the same time spreads the stitches, as shown. The operation is now repeated
100 exactly as it has been described above. The feeding motion occurs only after three strokes have been made by the pricker and needle. The feed may be produced by any of the well-known means actuated by the main
105 shaft E.

The stitching operation, which we have described with reference to the leading pricker and needle in forming the stitches on the right side, is exactly imitated by the succeeding
110 pricker and needle in forming the stitches on the left side, so that there is no necessity of repeating the description. The feed must be so adjusted that the succeeding pricker comes exactly over and enters a hole which
115 has already been made by the first pricker.

In Fig. 9 letters B and D designate the leading pricker and needle, and B' and D' the second pricker and needle, said leading and second prickers being here shown three
120 lengths of feed apart. The needle D' is here shown as being turned outwardly to the left, while the leading needle D lies against the pricker. In the actual operation of the machine the two needles are both either always
125 turned inwardly or turned outwardly at the same time. To avoid the necessity of duplicating the view, we have shown the needles in the positions above pointed out. The shuttles are shown in dotted lines, they being
130 of an ordinary type and working always on the same sides of the needles. The shuttles are also shown in Fig. 5, as well as the two elongated slots through which the needles

pass. The needle D, as shown, has just commenced the formation of the sixth cross-stitch, and the needle D' at this time likewise lies against the pricker B' and commences the third cross-stitch. It is, however, shown as turned outwardly for the formation of the second of the three stitches.

It will be noticed that the pricker is much larger in cross-section than the needle and that the points of the pricker and of the needle are as close together as possible, so that when the needle is thrown outwardly it will pierce the fabric directly opposite the hole made by the pricker.

As shown at P, the stitch I is formed on the first descent of the pricker. On the second descent, with the needle thrown out, the stitch II is formed, and on the third descent the stitch 3, close to I and partly crowding it in the direction of the feed, is formed. This stitch 3 is indicated by dotted lines. The stitch 3 is bodily carried into the position III by the forward feed movement of the fabric.

The usual tension of the threads holds the stitches in place, and thus the tension will crowd the stitch I into the upper corner of the respective hole, Fig. 9, made by the pricker, and the forward feed movement of the fabric in the same way crowds the stitch III from its position 3 into its corner.

We do not confine ourselves to the exact arrangement and details hereinbefore described and shown, as we might operate with one pricker and needle instead of two; but in this case the stitching would be to one side only.

What we claim as new is—

1. In a cross-hemstitch sewing-machine, a feeding mechanism, a needle-bar, means for actuating the same to make three reciprocations between successive feeds, combined with a pricker fixed to the lower end of the needle-bar and formed with a pocket for the reception of the needle; an arm pivoted to the lower end of the needle-bar and carrying

the needle, operative means substantially as shown for holding the needle between the successive feeds against the pricker for the first stitch, away from the pricker for the next stitch and again against the pricker for a third stitch, substantially as described.

2. In a cross-hemstitch sewing-machine, a feeding mechanism, a needle-bar A, means for actuating the same to make three reciprocations between successive feeds, in combination with two prickers fixed to the lower end of the needle-bar in the line of the feed and provided with pockets for the needles; arms pivoted to the lower end of the needle-bar and carrying the needles, operative means, substantially as shown, for holding the needles between successive feeds against the prickers during the first stitch, away from the same during the second stitch and against the same during the third stitch, substantially as specified.

3. In a cross-hemstitch sewing-machine, a needle-bar A, means for actuating the same to make three reciprocations between successive feeds, in combination with two prickers B B fixed to the lower end of the needle-bar in the line of the feed and provided with pockets b for the needles; arms C C pivoted to the lower end of the needle-bar and carrying needles D D, a pinion F on the driving-shaft E of the machine gearing into wheel H, a cam h, rods J J' and connecting-lever M; the rods J J' being connected to the corresponding arms K K attached to the arms C C and actuated by the cam h; two shuttles, and a suitable feed apparatus operated after each third stitch, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

FRIEDRICH GEGAUF.
JOHAN GEORG GEGAUF.

Witnesses:

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H. RABHART.