

(No Model.)

3 Sheets—Sheet 1.

F. H. BANCROFT.

MACHINE FOR INSERTING DIAGONAL STRIPS IN WOVEN CANE WORK.

No. 539,405.

Patented May 21, 1895.

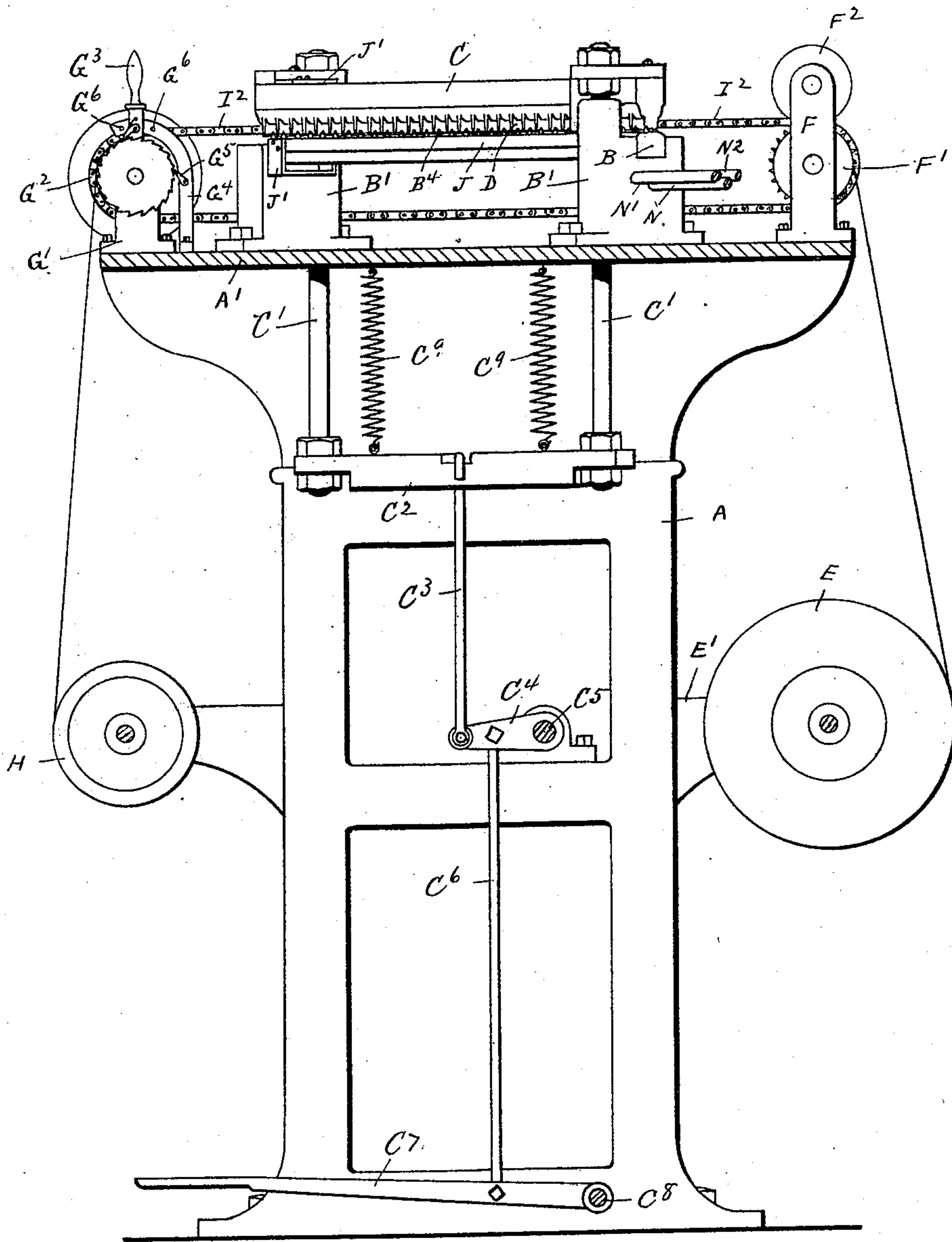


Fig. 1

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Henry W. Fowler.

Inventor
Frank Herbert Bancroft.
By his Attorney
Rufus B. Fowler

(No Model.)

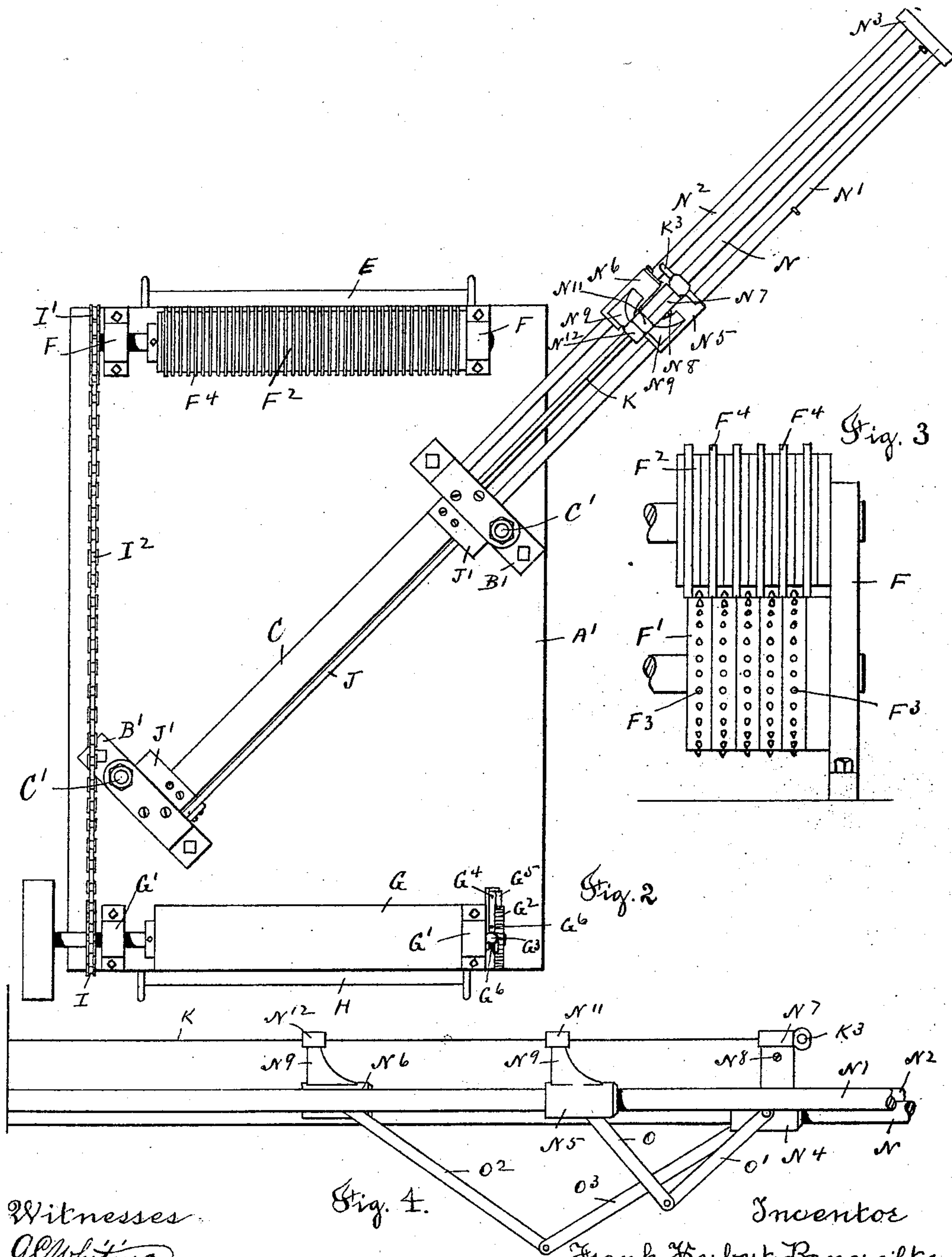
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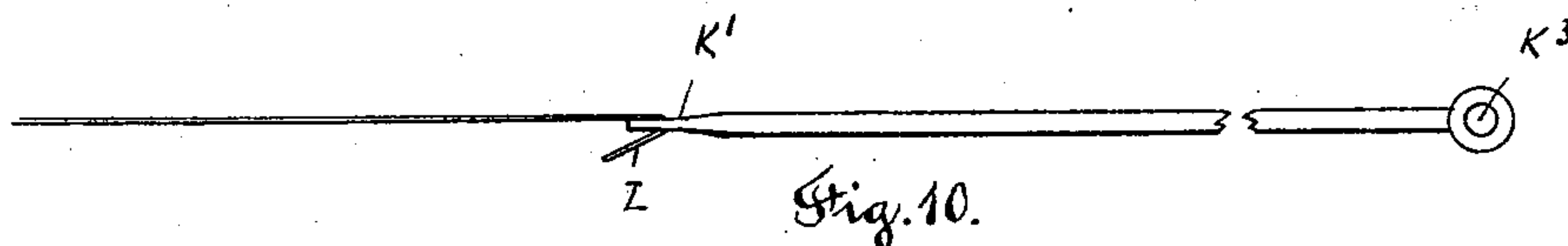
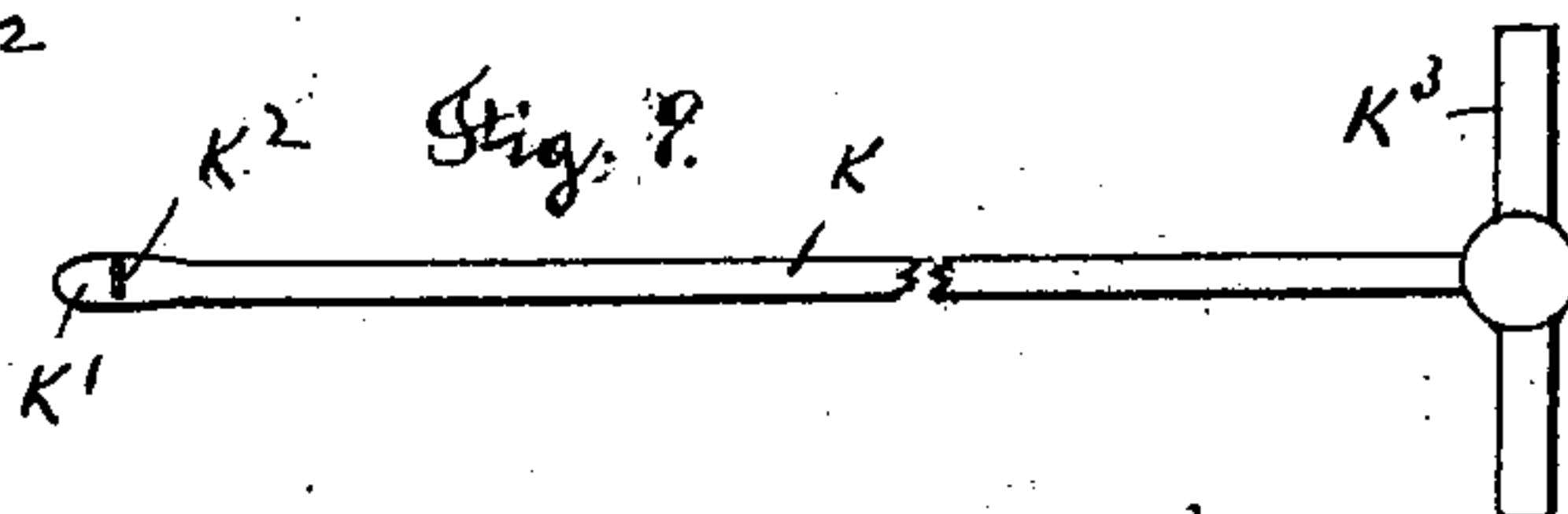
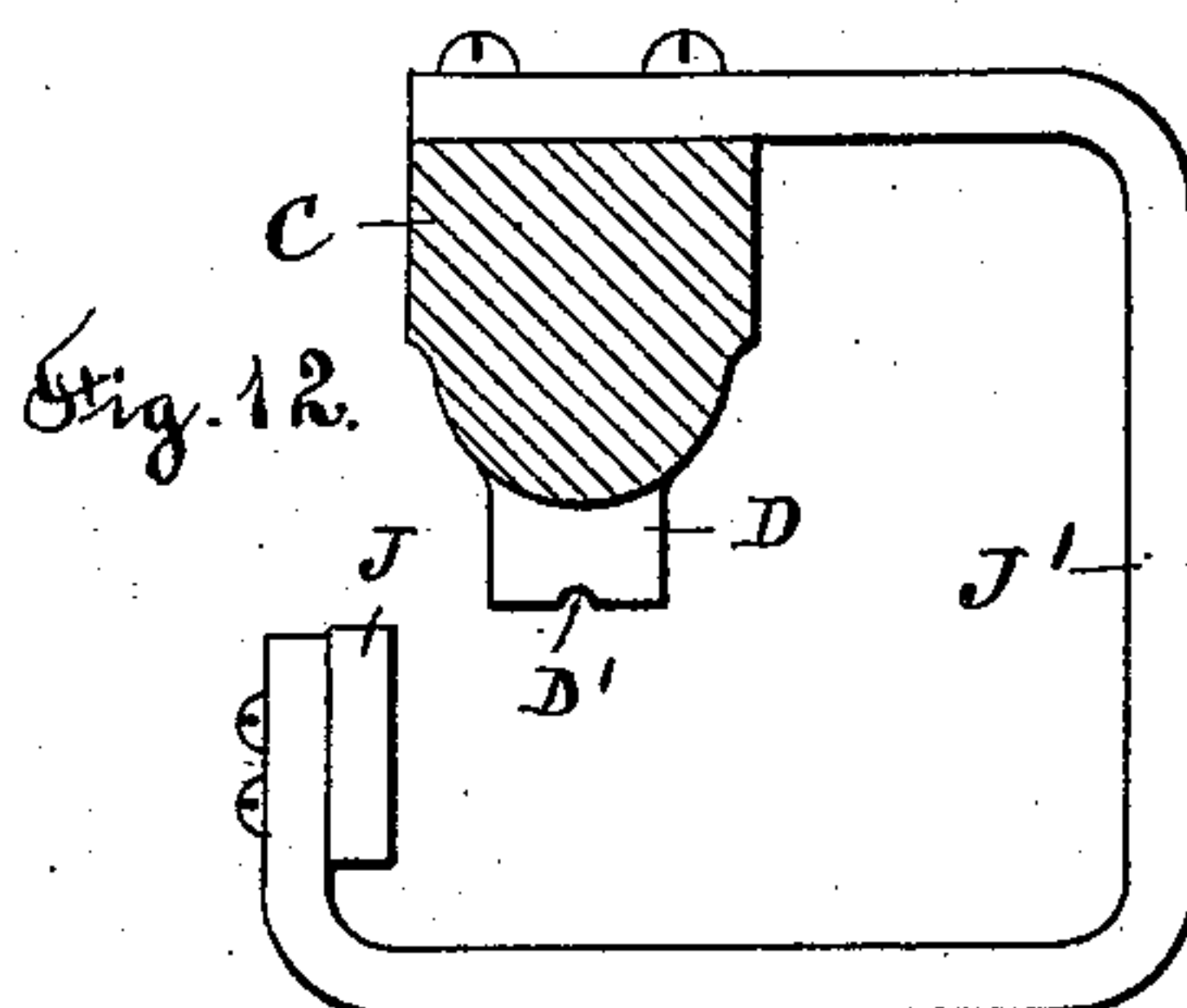
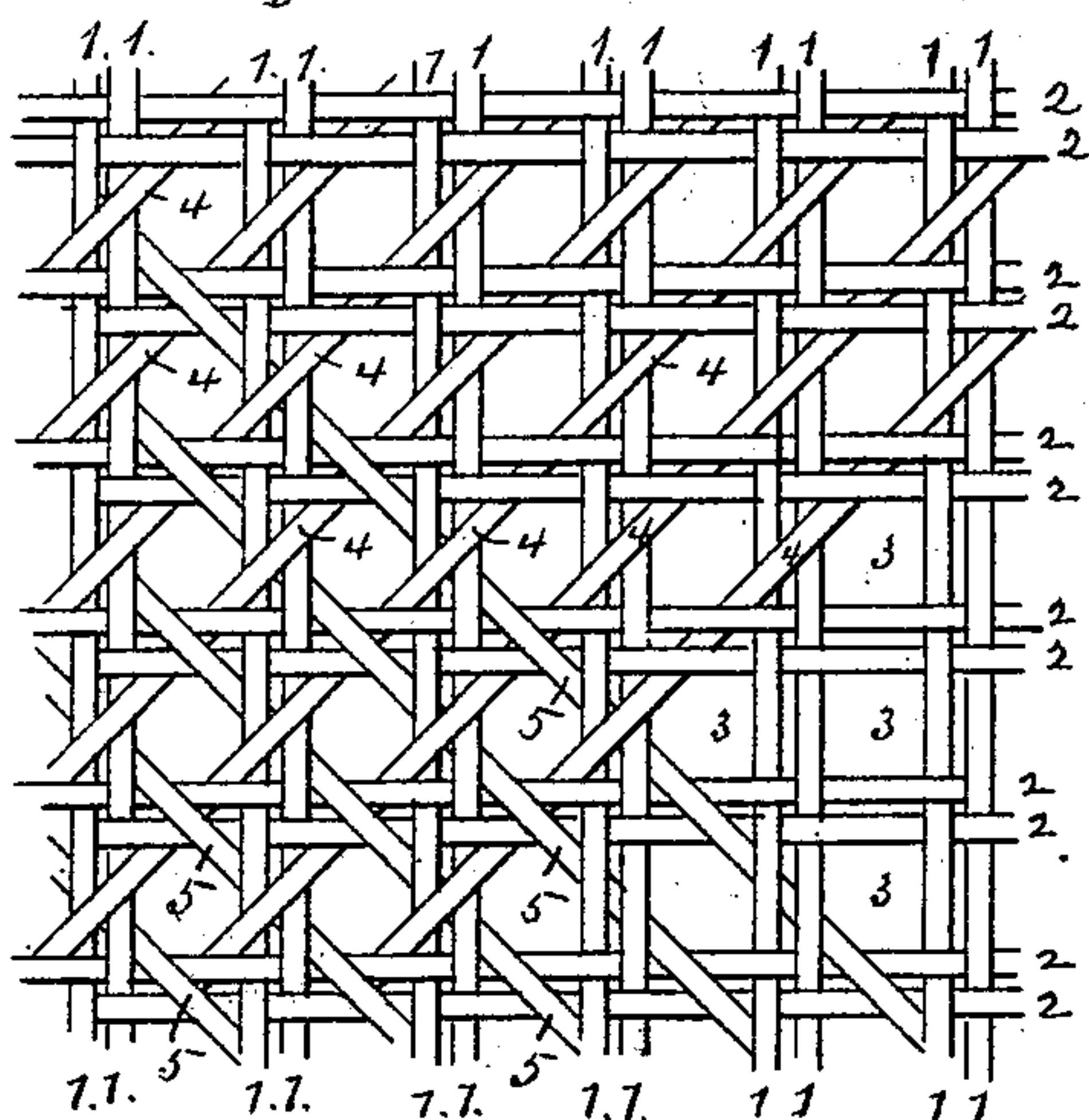
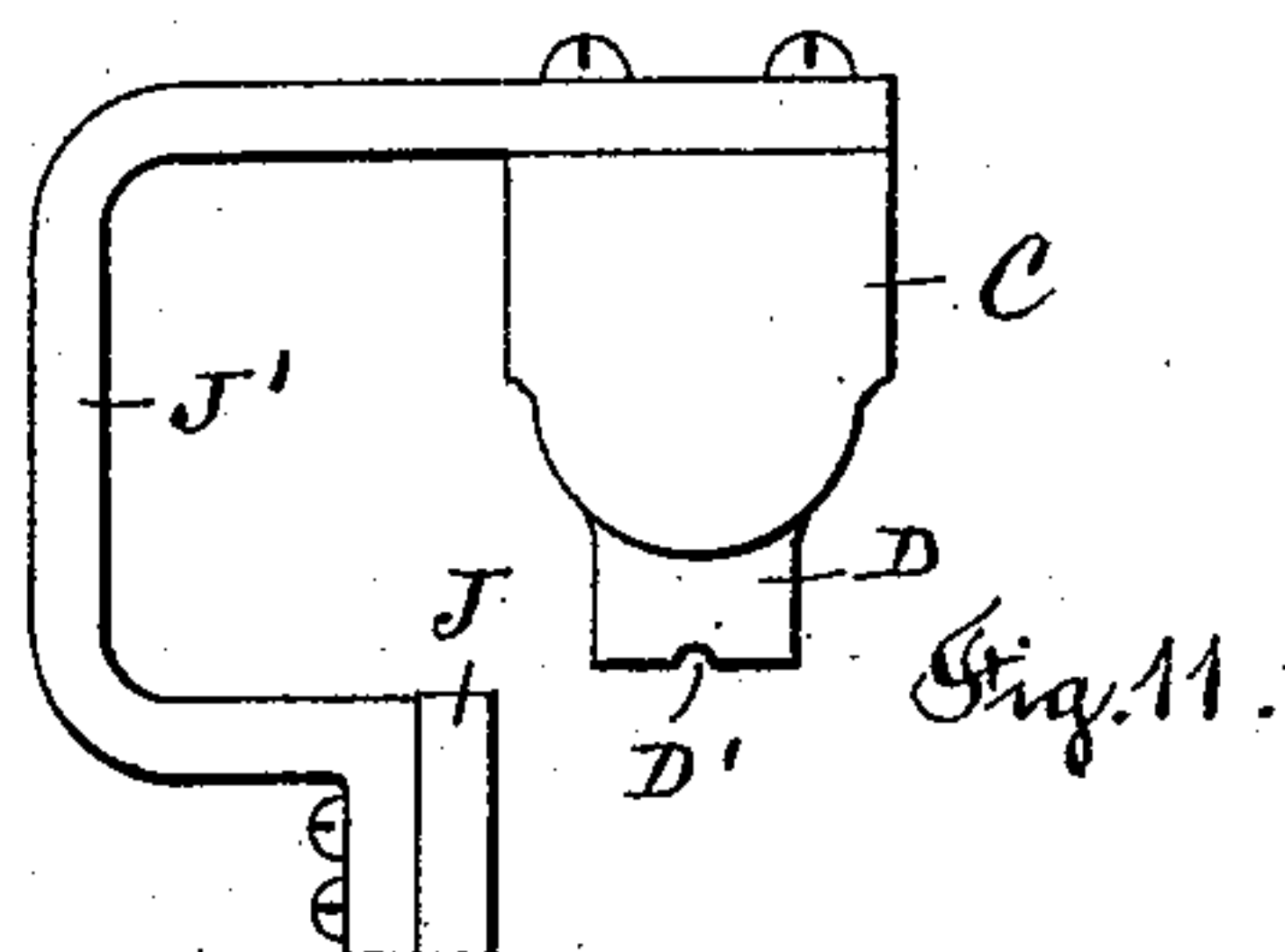
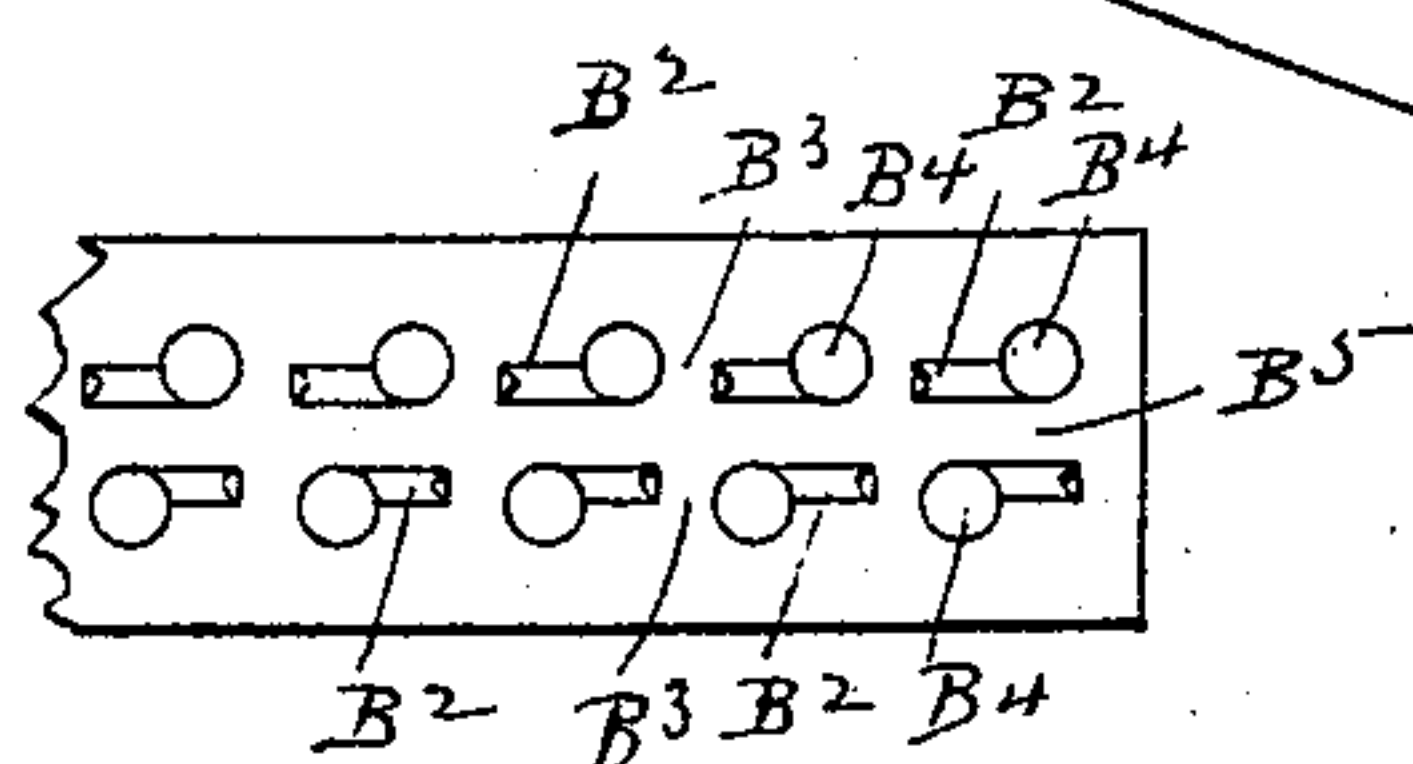
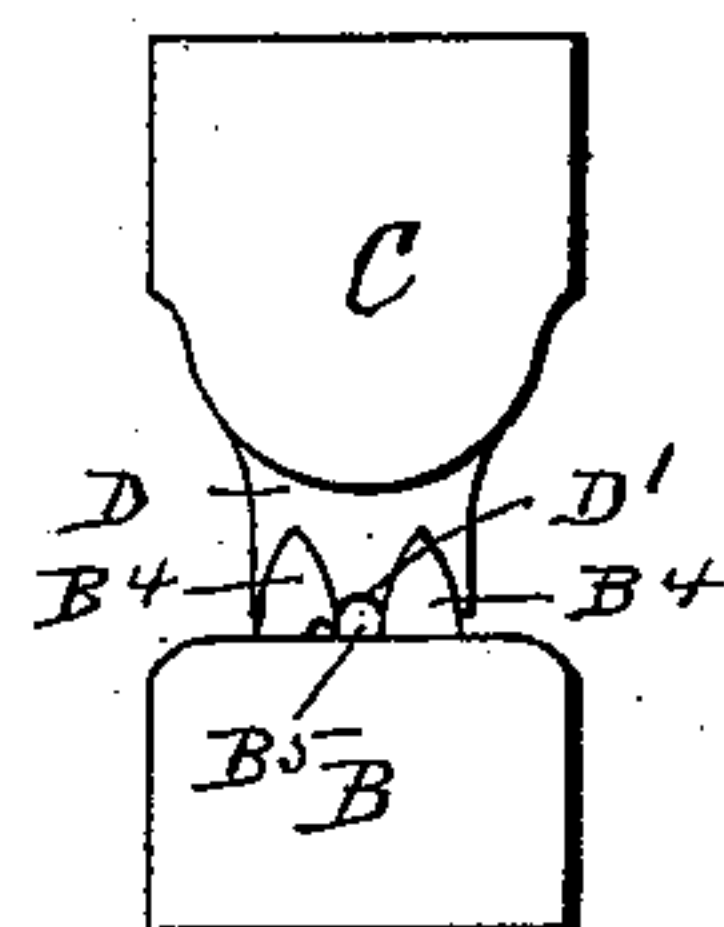
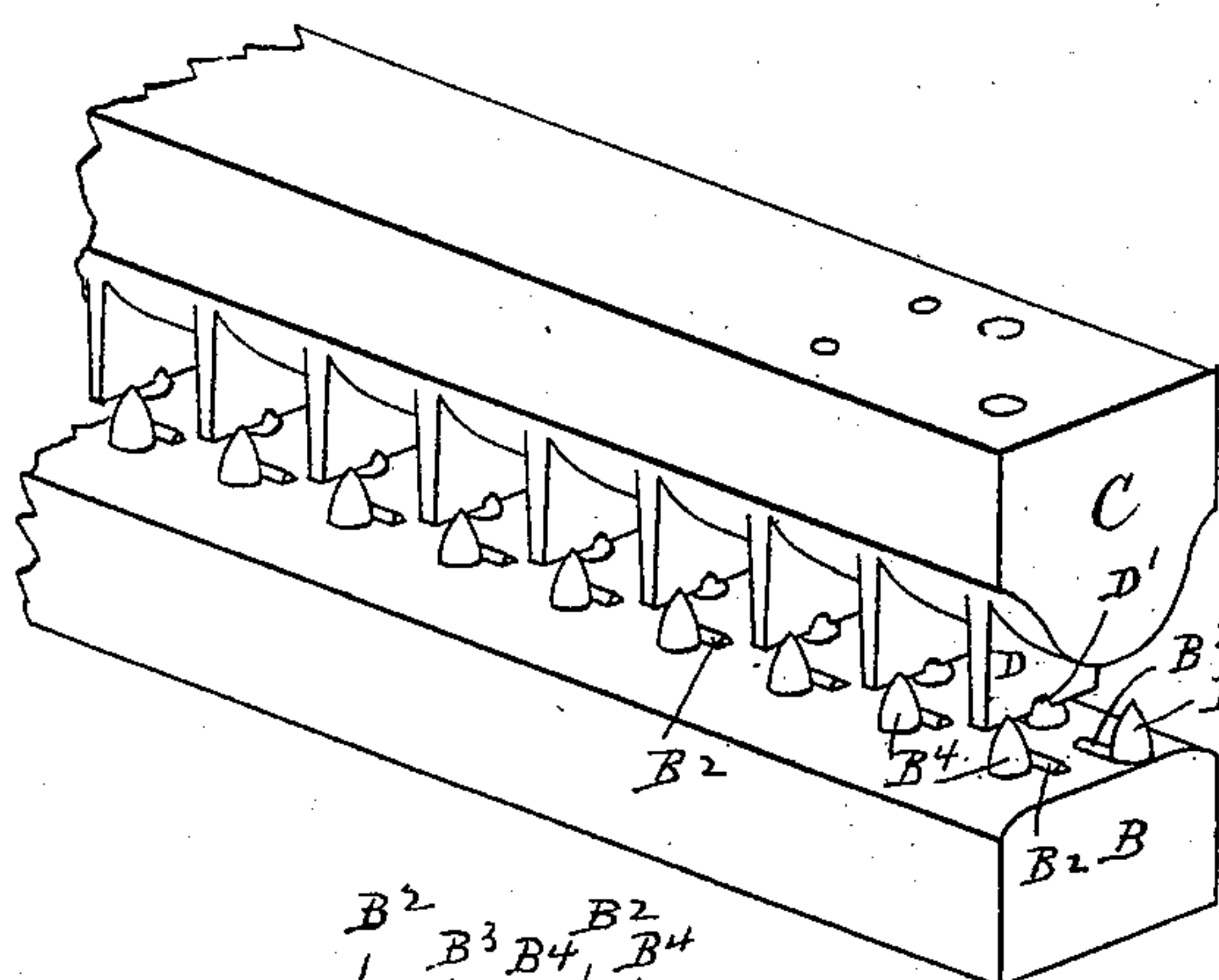
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UNITED STATES PATENT OFFICE.

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OF ONE-HALF TO HENRY M. RICH, OF SAME PLACE.

MACHINE FOR INSERTING DIAGONAL STRIPS IN WOVEN CANE-WORK.

SPECIFICATION forming part of Letters Patent No. 539,405, dated May 21, 1895.

Application filed December 26, 1893. Serial No. 494,655. (No model.)

To all whom it may concern:

Be it known that I, FRANK HERBERT BANCROFT, a citizen of the United States, residing at Gardner, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Machines for Inserting Diagonal Strips in Woven Cane-Work, of which the following is a specification, accompanied by drawings representing a machine embodying my invention, in which—

Figure 1 represents a side elevation of the machine, one side of the framework having been removed. Fig. 2 is a top view of the machine. Fig. 3 represents a front view of a portion of the rolls between which the woven fabric is conducted to the machine. Fig. 4 is a detached view of the device for supporting the needle by which the diagonal strips are inserted in the woven fabric. Fig. 5 is a perspective view of a portion of the clamping-bars. Fig. 6 is an end view of the same. Fig. 7 is a top view of the lower clamping-bar. Fig. 8 represents a piece of woven cane fabric having the diagonal strips inserted in a portion of the same. Fig. 9 is a view of the needle. Fig. 10 represents the needle with a strip of cane inserted in its eye. Figs. 11 and 12 are end views of the stripping-bar and its supporting-straps.

Similar letters and figures refer to similar parts in the different figures.

The object of my invention is to provide mechanism to facilitate the introduction of diagonal strips of cane, alternately over and under the warp and weft strands and across the corners of the rectangular spaces, or meshes, formed by the warp and weft strands, as the fabric is woven in the loom.

Referring to Fig. 8, 1, 1, denote the warp strands arranged in pairs and 2, 2, the weft strands also arranged in pairs; said warp and weft strands being woven together in the loom, so as to form rectangular spaces, or meshes 3, 3.

The diagonal strips which run obliquely across the fabric, in one direction, are indicated by the figures 4, 4, (Fig. 8) and the diagonal strips which run obliquely across the fabric in the opposite direction are indicated by the figures 5, 5, (Fig. 8.) The woven fab-

ric formed by the interlacing at right angles to each other of the warp and weft strands 1, 1 and 2, 2, as prepared upon the loom, is completed by the introduction of the diagonal strips 4, 4, and 5, 5, and it is the object of my present invention to provide mechanism to aid in the introduction of these diagonal strips.

The diagonal strips pass alternately over and under the warp and weft strands, and in my invention I employ means for clamping the woven fabric between a pair of clamping bars which are provided with alternate projections and spaces between said projections, so that the warp and weft strands of the fabric will be pressed alternately upward and downward, so as to form an open space, sufficiently large to allow a strand needle having an eye at its end to be passed through the fabric. The end of a strip of cane is then inserted in the eye of the needle, and the needle withdrawn, pulling the strip of cane through the space formed for it by the action of the clamping bars. The woven fabric is then moved along the distance between the meshes and the operation repeated, until all the diagonal strips running in one direction across the fabric have been inserted. The fabric is then turned over and the diagonal strips are inserted in the opposite direction in the same manner.

My invention has for its objects to provide means for controlling and operating upon the woven fabric, in the separation of the warp and weft strands, to form a passage for the strand needle; also to correct any irregularity in the meshes of the fabric caused by the displacement of the warp and weft strands, and further to provide means for a quick and convenient manipulation of the strand needle, by which the diagonal strips are drawn into the fabric.

Referring to the drawings, A denotes one side of the supporting frame-work, the side nearest the observer having been removed. A' is a table supported upon the frame A and upon which is mounted the clamping bars B and C. The lower clamping bar B is held in a fixed position upon the blocks B', B', attached to the table A'. The upper clamping bar C is attached to the upper ends of the slid-

ing rods C', which slide through holes in the blocks B' and are connected at the lower ends by the cross-bar C². The hooked link C³ engages the cross-bar and is pivoted to an arm C⁴, attached to a rocking shaft C⁵, journaled in the frame of the machine. The arm C⁴ is connected by a link C⁶ with a foot treadle C⁷ pivoted at C⁸ to the frame-work of the machine, allowing the upper clamping bar C to be drawn down upon the clamping bar B, by the depression of the foot-treadle C⁷. Springs C⁹ connect the cross-bar C² with the under side of the table and serve to reverse the mechanism and raise the clamping bar C. The lower clamping bar B is provided with a series of short projecting ribs B² and arranged in parallel rows, with spaces B³ intervening between the ribs of each row. The block B is also provided with two rows of tapering and pointed pins B⁴. The pins B⁴ are arranged along the clamping bar B, in proper position to correspond with two contiguous rows of meshes 3, 3, and the bases of the pins are sufficiently large to diametrically fill the rectangular meshes so that when the fabric is pushed on to the pins B⁴, they will enter each mesh in two contiguous rows of meshes and crowd the warp and weft strands together, so as to secure uniformity and regularity in the size and form of the mesh.

The upper clamping bar C is provided upon its lower side with a series of projecting blades D arranged transversely to the clamping bars C and having their ends opposite the spaces B³, in the lower clamping bar B. The short ribs B² on the lower clamping bar B, are arranged in two parallel rows with a space B⁵ between the rows forming a continuous channel lengthwise the clamping bar B through which the strand-needle passes, and the ribs B² are also arranged in pairs with spaces B³ between the ends of each contiguous pair of ribs, said spaces B³ extending crosswise the clamping bar B and opposite the ends of the blades D which project from the upper clamping bar C. Each of the blades D, is provided with a notch D' in the center of its end, the series of notches D' being in alignment with the space B⁵, between the short ribs B², upon the bar B, when the clamping bars are brought together in order to provide a passage through the blades D for the strand-needle.

The clamping bars B and C mounted upon blocks B', B', are arranged diagonally across the table A', so that when the fabric is drawn over the table, the position of the clamping bars B and C, will correspond with a row of meshes extending obliquely across the fabric.

The fabric in the form of a long web and of sufficient width to form a chair seat, or back, is wound upon a spool E mounted upon a bracket E' at the rear of the machine. Attached to the table A' and at its rear side are the supporting stands F, F, in which are journaled a pair of rolls F' and F². The lower of these rolls F', is provided with a series of

spurs, F³, similar in form and size to the tapering pins B⁴, upon the lower bar B, and arranged circumferentially in parallel rows upon the roll so as to engage the meshes of the fabric, as it is drawn from the spool E between the rolls F' and F². The upper roll F², is provided with a series of circumferential ribs F⁴, arranged between the rows of spurs F³, so they will press upon the fabric and crowd it down against the roll F², causing the spurs F³ to enter the meshes of the fabric. The fabric is conducted from the spool E between the rolls F' and F²; through the clamping bars B and C, and between the blocks B', B', over a take-up roll G, mounted in stands G' attached to the table A', and from the take-up roll G the completed fabric is wound upon a spool H.

The take-up roll G is covered with a plate of sheet metal, provided with perforations forming spurs, or burrs, upon the metal, in order to engage the fabric as the roll is rotated. Upon the shaft of the roll, I place a ratchet wheel G², allowing the roll to be turned by a hand lever G³, pivoted concentrically with the shaft of the roll and carrying a pawl engaging the ratchet wheel G². A stand G⁴ is attached to the table A' which supports a retaining pawl G⁵ and is provided with pins G⁶, which limit the angular movement of the lever handle G³.

The shafts of the rolls F' and G are provided with sprocket wheels I, I', which are connected by a chain belt i², so that the rotation of the take-up roll G will be imparted to the toothed roll F'.

Suspended from the upper clamping bar C is a bar J attached by the straps J', J' to the clamping bar C, so that the bar J will have a rising and falling motion corresponding with the movement of the bar C. The bar J, which I term a stripping bar, is held at the side of the lower clamping bar B and with its upper edge flush with the upper surface of the clamping bar B.

The stripping bar J is supported at its opposite ends by the straps J', J'; the strap supporting one end of the stripping bar being shown in Fig. 11 and the strap supporting the opposite end of the stripping bar being shown in Fig. 12.

In the operation of the machine, the woven fabric which passes between the two clamping bars B and C is pressed down against the lower clamping bar B, by the downward motion of the upper clamping bar C; the pins B⁴ entering the meshes of two contiguous rows of meshes in the fabric; the tapering sides of the pins serving to crowd the strands apart, so as to make all the meshes of a uniform size. When the upper clamping bar C is lifted, the fabric is stripped off the pins by the lifting action of the stripping bar J; the fabric being raised entirely clear of the pins B⁴. When the clamping bar C is brought down upon the fabric, as described, the blades

D will crowd a portion of the warp and weft strands down into the spaces B^3 between the ends of the ribs B^2 on the lower clamping bar B, while other portions will be held up by the short ribs B^2 , so that the needle when inserted through the space B^5 , will pass under portions and over other portions of the strands in the fabric.

The strand needle K represented in Figs. 9 and 10, consists of a slender steel wire flattened at one end at K' and provided with an eye K^2 to receive the end L of a strand of cane, as represented in Fig. 10. The opposite end of the needle, is provided with a handle K^3 to allow the needle to be pushed back and forth through the fabric. Projecting from the side of one of the blocks B' , are three parallel rods N, N' , N^2 , united at their free ends by a cross-bar N^3 . The rods N, N' and N^2 , support the sliding sleeves N^4 , N^5 and N^6 , each having a spline connection with its rod to prevent the sleeves from turning. The sleeve N^4 , sliding upon the central rod N, is provided with an arm N^7 formed in two parts, which are clamped together by a screw N^8 , so as to pinch the needle K between them and hold it in alignment with the open space in the fabric, formed to receive it by the action of the clamping bars B, C. The sleeves N^5 , N^6 , are also provided with arms N^9 , having hubs N^{11} and N^{12} , provided with holes to receive the needle K, said holes being in alignment with the needle K, when one end of the needle is supported by the arm N^7 and the opposite end of the needle rests in the space B^5 , so the needle, when it is being pushed through the fabric, will slide freely in, and be supported by the hubs N^{11} , N^{12} . The sleeve N^5 , is connected with the sleeve N^4 by the links O and O' , and the sleeve N^6 is connected with the sleeve N^4 by links O^2 and O^3 , each being double the length of the links O and O' , so that when the needle is withdrawn from the fabric and the sleeve N^4 moved to the free end of the rod N, the sleeves N^5 and N^6 will be drawn along the rods N' and N^2 , so the hubs N^{11} , N^{12} will support the strand needle and divide it into equal spaces.

When the strand-needle K is pushed forward into the fabric by the operator by means of the handle K^3 , the sleeve N^4 will slide along the rod N until the arm N^7 comes in contact with the hub N^{11} , when the sleeve N^5 will be pushed along its rod until the hub N^{11} comes in contact with the hub N^{12} , when the sleeve N^6 will be pushed along its rod as the needle is pushed through the fabric. The strand needle K, is long enough to project through the fabric, far enough to allow the end of a strand of cane to be inserted in the eye of the needle, as represented in Fig. 10, when the needle is withdrawn from the fabric drawing strand of the cane through the space prepared for it in the fabric. As the needle is withdrawn, the links O, O' , O^2 , O^3 , are straightened, drawing the sleeves N^5 and

N^6 back into proper position, so the hubs N^{11} and N^{12} will support the needle and prevent it from bending by any resistance in its passage through the fabric.

The operation of the machine is as follows: The fabric is conducted through the clamping bars B, C. The clamping bar C is depressed, pushing the fabric down upon the clamping bar B and causing the tapering pins B^4 to enter two adjoining oblique rows of meshes, so as to not only hold the fabric in position, and remedy any displacement of the warp and weft strands, but also to produce a uniformity in the size of the meshes. The tapering pins B^4 are pointed at their ends so they will readily enter the meshes, and as the woven fabric is pushed down by the ends of the blades D, the tapering sides of the pins crowd the strands of the fabric apart, in case the mesh has been contracted, and as the diameter of the base of each pin is equal to the side of the mesh, it follows that all the meshes will be brought to a uniform size as the web is moved along and the rows of meshes are successively engaged by the rows of tapering pins. The two rows of tapering pins B^4 are placed at the ends of the short ribs B^2 with the adjacent pins in each row at opposite ends of each pair of short ribs, as shown in Fig. 7, so the strands of the woven fabric, which are required to be raised will be brought over the short ribs B^2 and the strands of the fabric which are required to be depressed will be brought over the spaces B^3 between the ends of the ribs and opposite the ends of the blades D so the downward movement of the clamping bar C and blades D will crowd certain of the strands into the spaces B^3 , while other of the strands will be held up by the short ribs B^2 , forming an open space through the fabric to receive the strand-needle K. The needle K is then pushed forward by means of its handle K^3 , through the fabric until the eye K^2 of the needle projects upon the opposite side. The end of a strand of cane is then inserted in the eye K^2 of the needle and the needle is withdrawn from the fabric, drawing the strand of cane diagonally through the fabric. The foot treadle C^7 is then released, allowing the springs C^9 to lift the clamping bar C and connected stripping bar J, thereby lifting the fabric off the pins B^4 and holding it free from the pins, so the fabric can be moved forward the space of one row of meshes by the angular motion of the hand lever G^3 .

I am aware that machines for separating the strands of a woven cane fabric to allow a needle to be inserted in order to draw a strand of cane diagonally through the fabric have been heretofore known, also that clamping bars, provided with alternate projections and depressions by which a space for the needle was formed are also old and I do not claim such features broadly. I deem it, however, to be broadly new to employ with such clamp-

ing bars, having alternate projections and depressions, a series of pins arranged to fill all the meshes in one or more contiguous rows of meshes extending obliquely through the fabric, said pins being adapted to enter between the warp and weft strands and crowd them apart, so as to maintain the meshes full size and hold the strands of the fabric in proper position to be acted on by the projections and depressions of the clamping bars. I also deem it to be new to provide one of the clamping bars with two rows of tapering pins arranged to engage two contiguous rows of meshes, and the opposite bar with a series of blades arranged transversely to the bar and to said rows of pins, so the ends of the blades will crowd the strands of the woven fabric down upon the sides of the pins.

Other features of novelty are specifically set forth in the annexed claims.

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

1. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a pair of clamping bars having their opposing faces provided with projecting surfaces, to press the strands of the fabric into different planes, in order to form a space for a diagonal strand, of a row of pins projecting from the face of one of said bars, said pins being arranged between the projecting surfaces on said bar and in substantial alignment therewith, whereby said pins are made to enter into a diagonal row of meshes, lying between the opposing faces of said clamping bars, substantially as described.

2. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a clamping bar B, of ribs B^2 projecting from the face of said bar, said ribs being arranged in two parallel rows with a space B^5 between said rows and spaces B^3 between the ends of the ribs in each row, conical pins B^4 arranged in two parallel rows in alignment with the ribs in each row of ribs and projecting from the face of said clamping bar between the ends of said ribs and an opposing clamping bar by which the woven fabric is pressed down upon said pins.

3. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a clamping bar B, of a row of conical pins B^4 projecting from the face of said bar B, an opposing clamping bar C and a series of blades projecting from the face of said bar C, said blades being arranged transversely to the faces of said bars B and C and opposite the spaces between said conical pins, whereby said blades are carried between said pins as the bars are brought together and the woven fabric is crowded down upon said conical pins, substantially as described.

4. In a machine for inserting the diagonal strips in a woven cane fabric, the combination of a series of conical spurs in two parallel rows, arranged to enter two contiguous diago-

nal rows of meshes in the woven fabric, said spurs having their bases equal in diameter to the length of the sides of the meshes of the woven fabric, a reciprocating block, blades projecting from said block and transversely to said rows of conical spurs, said blades reaching across the space between said parallel rows of spurs, whereby the woven fabric is simultaneously pushed over the sides of the spurs in each of said rows, substantially as described.

5. In a machine for inserting diagonal strips in a woven cane fabric, the combination of a clamping bar B' , a series of short ribs B^2 projecting from the surface of said bar and arranged in two parallel rows with a space B^5 between said rows, and spaces B^3 between the ends of said ribs in each row, conical pins B^4 projecting from the surface of said bar at the ends of said ribs, a clamping bar C and blades D projecting from the opposing surface of said bar C, said blades being arranged transversely to said bar C and opposite the spaces B^3 and having a central notch D' in their ends opposite the space B^5 , substantially as described.

6. In a machine for inserting diagonal strips in a woven cane fabric, the combination of a pair of clamping bars having opposing faces between which the woven fabric is clamped, rolls placed upon opposite sides of said clamping bars with the upper surfaces in a plane passing between said clamping bars, said rolls being provided with surfaces adapted to engage said woven fabric, and means by which said rolls are operatively connected, whereby they are simultaneously rotated to move said woven fabric between said clamping bars, substantially as described.

7. In a machine for inserting diagonal strips in a woven cane fabric, the combination of the clamping bar B, conical pins B^4 projecting from the surface of said bar, clamping bar C, blades D arranged transversely to said bar C and opposite the spaces between said conical pins, straps J' , J' attached to said bar C, a bar J carried by said straps J' and means for imparting a reciprocating motion to said bar C, substantially as described.

8. In a machine for inserting diagonal strips in a woven cane fabric, the combination of a clamping bar B, a series of conical pins projecting from the face of said bar and arranged in a row corresponding with the rows of meshes in the woven fabric, a reciprocating clamping bar C, blades projecting from said bar and arranged transversely thereto, means for feeding the woven fabric between said bars, a bar J connected with said reciprocating bar C, so as to be held in the plane of the points of said conical pins, when said clamping bars B and C are separated, whereby said fabric is supported during said feeding movement, substantially as described.

9. The combination with a pair of clamping bars arranged to press the strands of a woven cane fabric into different planes, in order to

form a space to receive a diagonal strip, of a rod N supported by the frame work of the machine, a sleeve N⁴ sliding on said rod, an arm projecting from said sleeve, a strand needle clamped in said arm, rods N' and N² parallel with said rod N, sleeves N⁵ and N⁶ sliding on said rods N' and N², arms projecting from said sleeves and having hubs N¹¹ and N¹² provided with openings in alignment with said needle, said sleeves N⁵ and N⁶, and links 10 connecting said sleeves with said sleeve N⁴, substantially as described.

Dated this 20th day of December, 1893.

FRANK HERBERT BANCROFT.

Witnesses:

ROY E. MAYE,

PETER H. BROOKS.