

(No Model.)

3 Sheets—Sheet 1.

F. H. BANCROFT & H. M. RICH.  
MACHINE FOR INSERTING DIAGONAL STRIPS IN WOVEN CANE WORK.  
No. 538,812. Patented May 7, 1895.

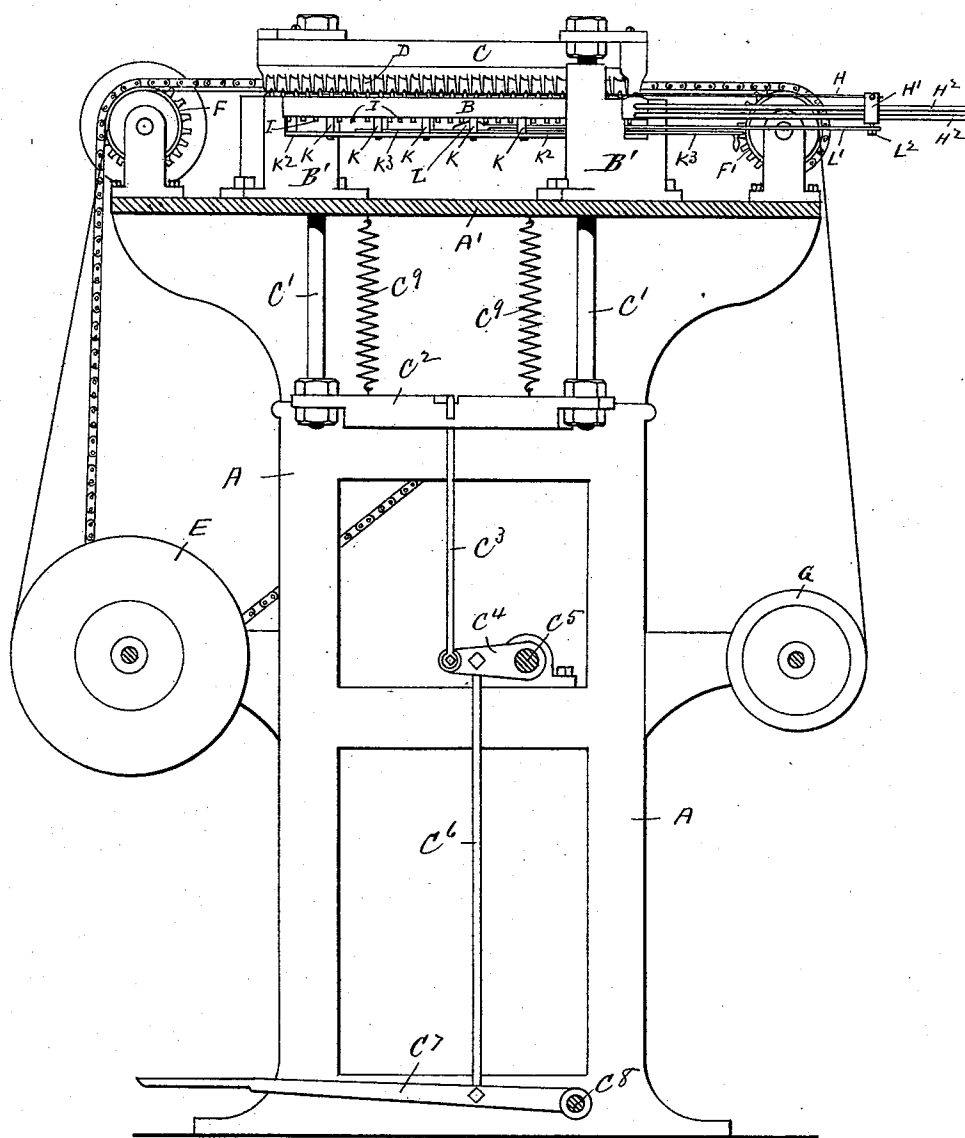


Fig. 1.

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By their Attorney

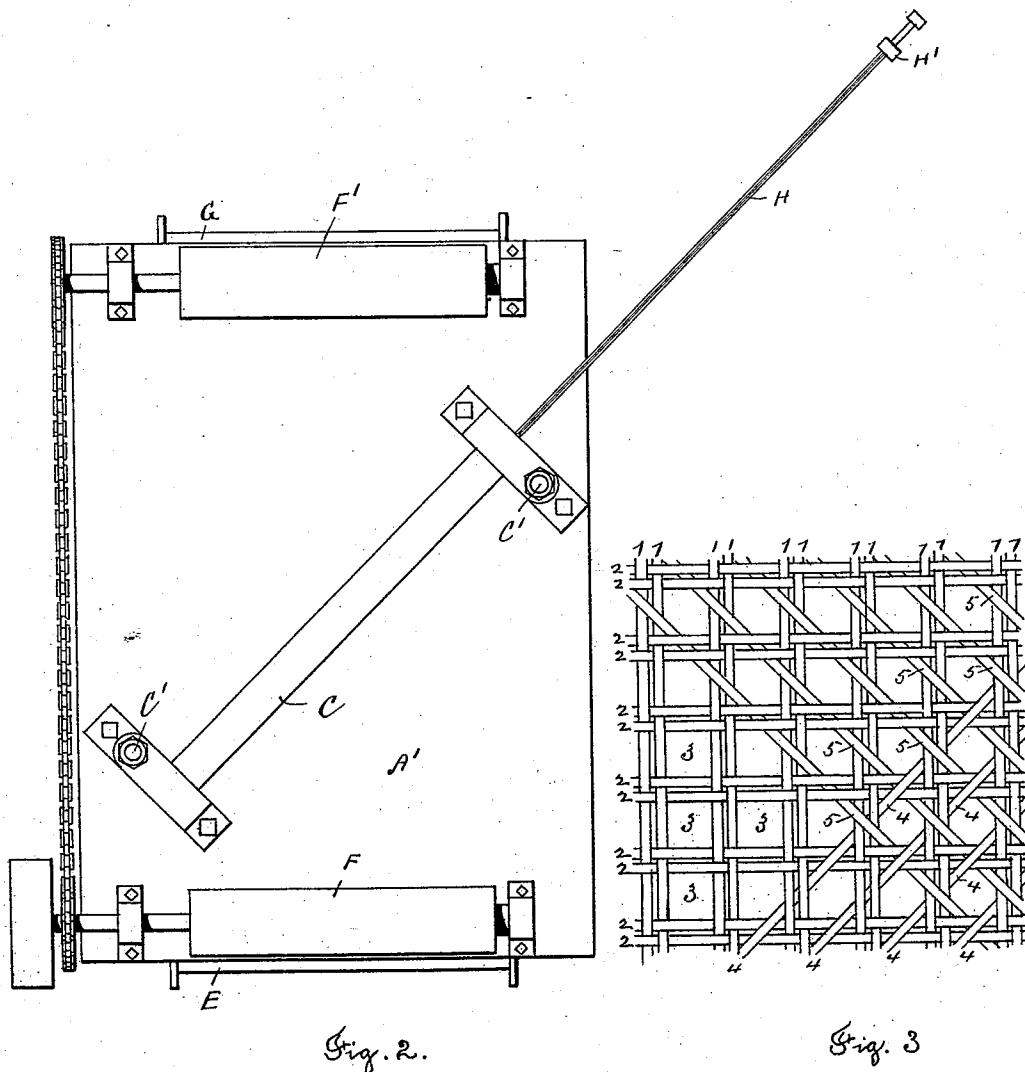
Refus B. Fowler

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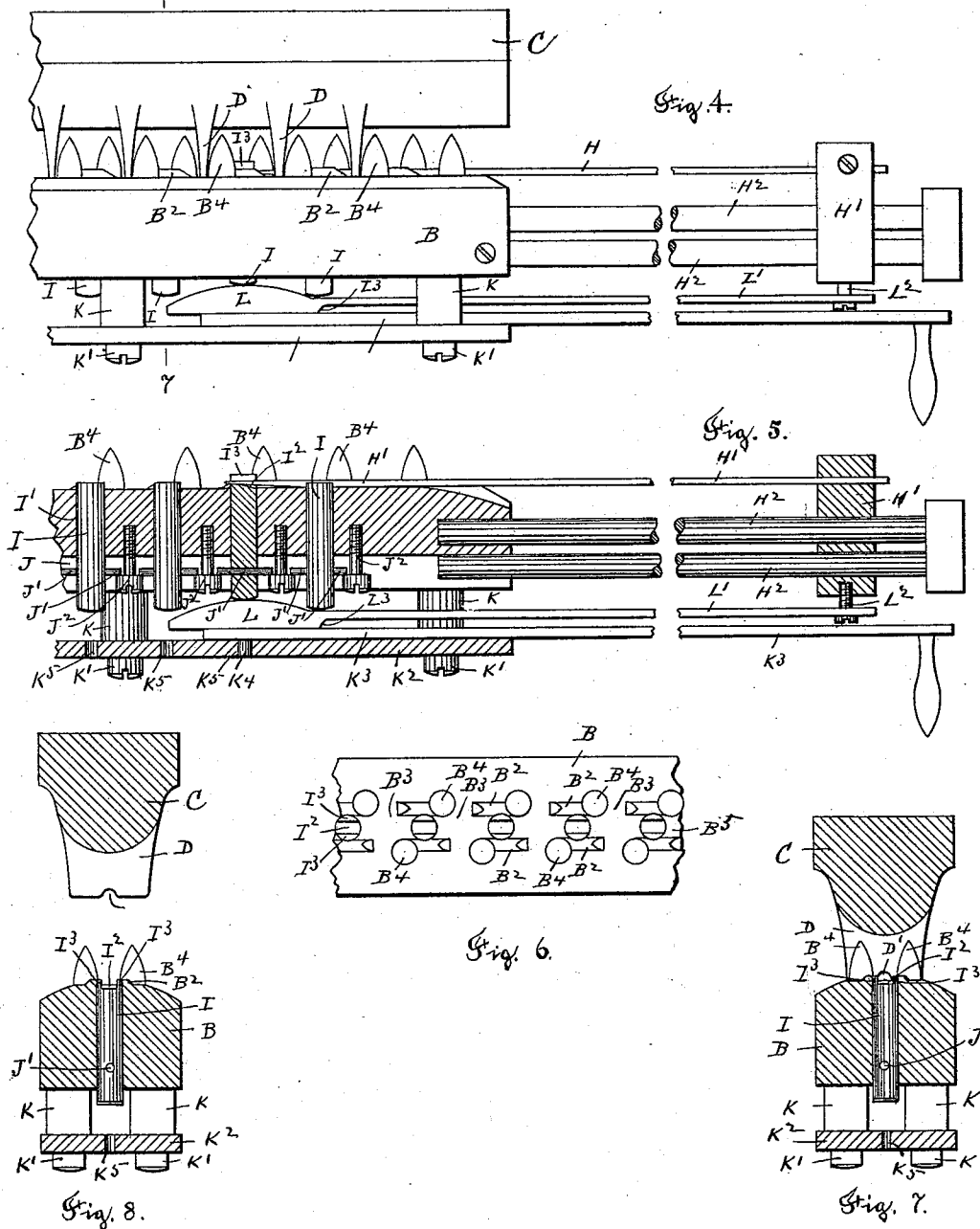
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# UNITED STATES PATENT OFFICE.

FRANK H. BANCROFT AND HENRY M. RICH, OF GARDNER, MASSACHUSETTS.

MACHINE FOR INSERTING DIAGONAL STRIPS IN WOVEN CANE-WORK.

SPECIFICATION forming part of Letters Patent No. 538,812, dated May 7, 1895.

Application filed May 29, 1894. Serial No. 512,938. (No model.)

*To all whom it may concern:*

Be it known that we, FRANK H. BANCROFT and HENRY M. RICH, citizens 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 forming a part of the same, and in which—

Figure 1 represents a side view of our improved machine, one side of the framework having been removed. Fig. 2 is a plan view. Fig. 3 represents a piece of woven cane-work having diagonal strips inserted in a part of the same. Fig. 4 represents, upon a larger scale, a portion of the separator-bars by which the strands of the woven fabric are separated in order to admit the strand-needle. Fig. 5 represents a portion of the lower separator-bar in central longitudinal sectional view. Fig. 6 is a top view of a portion of the lower separator-bar. Fig. 7 is a transverse sectional view of the separator-bars on line 7 7, Fig. 4, the bars being shown as brought together; and Fig. 8 represents the same sectional view as shown in Fig. 7, but with the bars shown as separated.

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

The present invention relates to certain improvements in machines for inserting the diagonal strips of cane alternately over and under the warp and weft strands of a woven cane fabric and it relates particularly to the mechanism by which the strands of the woven fabric are alternately raised and lowered across the woven fabric in order to allow a strand needle to be inserted diagonally through the woven fabric and pass alternately over and under the warp and weft strands.

Referring to Fig. 3, 1, 1 denote the warp strands and 2, 2 the weft strands of the woven fabric arranged in pairs at right angles to each other and forming rectangular meshes 3, 3. The woven fabric is placed between a pair of bars provided with projections upon their opposing faces which press upon the upper and under side of the warp and weft strands, whereby some are raised and others are depressed and brought into different

planes to allow a strand needle having an eye in its end to be inserted diagonally through the fabric over and under the warp and weft strands. The end of a strip of cane is then inserted in the eye of the strand needle and the needle withdrawn from the woven fabric, drawing the cane strip diagonally through the fabric as represented at 4, 4 and 5, 5, Fig. 3. This method of inserting the diagonal strips in woven cane work by the use of a pair of separator bars and a strand needle, as described, is well known and we have only shown in detail in the accompanying drawings such portions of the mechanism as concern our present invention.

In the accompanying drawings A denotes the frame-work of the machine supporting a table A' upon which the separator bars B, C, are mounted, extending diagonally across the table. The lower separator bar B is held in a fixed position upon blocks B' attached to the table A'. The upper separator bar C is attached to the upper ends of the sliding rods C' connected at their lower ends by a cross bar C<sup>2</sup>. The hooked link C<sup>3</sup> engages the cross bar and is pivoted to a lever C<sup>4</sup> attached to a rock shaft C<sup>5</sup> which is journaled in the frame of the machine. The lever C<sup>4</sup> is connected by a link C<sup>6</sup> with a foot treadle C<sup>7</sup> pivoted at C<sup>8</sup> to the frame-work of the machine, allowing the upper separator bar C to be drawn down upon the lower separator bar B by the depression of the foot treadle C<sup>7</sup>. Springs C<sup>9</sup> connect the cross bar C<sup>2</sup> with the under side of the table and serve to reverse the mechanism and raise the separator bar C. The lower separator bar B is provided with a series of short projecting ribs B<sup>2</sup> arranged in parallel rows with spaces B<sup>3</sup> intervening between the ribs of each row and it is also provided with two rows of tapering and pointed pins B<sup>4</sup> which are arranged along the separator bar B in proper position to correspond with two contiguous rows of rectangular meshes in the woven fabric.

The upper separator bar C is provided upon its lower side with a series of projecting blades D, the ends of which are brought opposite the spaces B<sup>3</sup> in the lower separator bar B. Each of the blades D is provided with a notch D' in the center of the end, the series of notches

D' being in alignment with the space B<sup>5</sup> between the short ribs B<sup>2</sup> upon the lower separator bar B.

The woven fabric, in the form of a long web, is conducted from a spool E over the roll F, between the separator bars and over the roll F' to a take-up roll G; and any well known means are provided by which the take-up roll G can be intermittently rotated in order to draw the fabric along between the separator bars and any well known means are applied to the delivery roll E by which the fabric is held taut and under requisite tension between the separator bars, such for example, as a friction strap or brake to the delivery roll and a pawl and ratchet rotating mechanism to the take-up roll. Such devices being well known, we have not deemed it necessary to show the same or describe them in detail.

It will be obvious, as the separator bars are brought together and the woven fabric compressed between them, that those portions of the strands, which are brought beneath the ends of the blades D will be pressed down into the spaces B<sup>3</sup> of the lower separator bar and such portions of the strands of the woven fabric as are brought over the short ribs B<sup>2</sup> will be raised forming a space for the strand needle diagonally through the woven fabric. The strand needle H is attached at one end to a sliding needle carrier H' sliding upon rods H<sup>2</sup> extending from one end of the lower separator bar B and forming ways for the needle carrier H' parallel with the space B<sup>5</sup> extending lengthwise the lower separator bar so the sliding movement of the carrier H' along the ways H<sup>2</sup> will push the free end of the strand needle H through the space formed by the separator bars.

In order to increase the size of the space formed for the strand needle and also to render the separation of the warp and weft strands more certain, we arrange in the lower separator bar B a series of sliding pins I, held in vertical holes I' which are formed between each pair of the projecting ribs B<sup>2</sup>. The upper ends of the sliding pins I are provided with the channels I<sup>2</sup> extending diametrically across the central part of the end of the pin and in alignment with the space B<sup>5</sup> between the ribs B<sup>2</sup> forming upon opposite sides of the channel I<sup>2</sup> the lips I<sup>3</sup>, I<sup>3</sup>. The under side of the lower separator bar has a longitudinal groove or channel J to receive the pins J' which project from the sides of the sliding pin so as to be caught by the heads of the screws J<sup>2</sup> held in the separator bar B, thereby preventing the sliding pins I from dropping out of the bar and holding them in their normal position with the upper ends of the lips I<sup>3</sup> flush with the tops of the short ribs B<sup>2</sup>. Depending from the under side of the lower separator bar B are bosses K to which are attached, by means of screws K', a plate K<sup>2</sup> which forms a support for a bar K<sup>3</sup> provided with a spur K<sup>4</sup>, projecting from its under side and arranged to engage one of a series of holes K<sup>5</sup> in the

plate K<sup>2</sup> so the bar K<sup>3</sup> can be adjusted in position and held from longitudinal movement upon the plate K<sup>2</sup>.

Sliding upon the bar K<sup>3</sup> is a lifting cam L loosely connected by a rod L' and screw L<sup>2</sup> with the needle carrier H'; the rod L' being of suitable length to bring the center of the lifting cam L beneath the free end of the strand needle H so that as the carrier H' is moved along the rods H<sup>2</sup> pushing the free end of the needle through the space prepared for it in the woven fabric, the lifting cam L will be simultaneously pushed along the surface of the bar K<sup>3</sup>.

As the cam L advances it will successively pass beneath and lift the sliding pins I, one after the other; each of the sliding pins being lifted in turn as the point of the needle passes over the pin, causing the point of the needle to rest upon the bottom of the diametrical channel I<sup>2</sup> to be raised high enough to insure its passage over the strands, which are depressed into the spaces B<sup>3</sup>; the lips I<sup>3</sup> at the same time lifting the strands which lie upon the ribs B<sup>2</sup> and causing the needle to pass beneath them. The lifting cam L is provided with a shoulder L<sup>3</sup> which allows the cam to fall when pushed over the end of the bar K<sup>3</sup> and rest upon the upper surface of the plate K<sup>2</sup> bringing its upper or cam surface too low to engage the sliding pins I and the point at which the lifting cam is disengaged from the pins, is determined by the adjustment of the bar K<sup>3</sup>, which in the operation of the machine, is adjusted to correspond with the width of the fabric so as to cause the lifting cam L to drop upon the plate K<sup>2</sup> when the point of the needle H has passed through the fabric.

As the webs of woven cane fabric differ in width and as it is only necessary to raise those sliding pins which lie beneath the fabric, the bar K<sup>3</sup> is adjusted so the lifting cam L will drop upon the plate K<sup>2</sup> after the cam has passed beneath the fabric.

While we have shown a series of sliding pins arranged to raise the strands of the woven fabric successively and in correspondence with the movement of the needle, yet we do not wish to confine ourselves to such sliding pins as it will be obvious that other and equivalent devices can be employed for that purpose or the specific construction and arrangement of the operating parts can be varied and still secure the above named result.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a machine for inserting the diagonal strips in a woven cane fabric, the combination with a pair of separator bars, of a series of sliding pins held in one of said separator bars and arranged to raise the strands of the woven fabric by their sliding motion, and connected means by which said pins are moved against the strands of the woven fabric, substantially as described.

2. In a machine for inserting the diagonal strips in a woven cane fabric, the combina-

tion with a pair of separator bars, of a series of sliding pins held in one of the separator bars and arranged to be pushed against the strands of the woven fabric and a sliding cam plate moving against the ends of said pins, whereby they are successively pushed against the strands of the fabric, substantially as described.

3. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a pair of separator bars, of a series of sliding pins held in one of said separator bars and arranged to be pushed against the strands of the woven fabric, a sliding cam plate, whereby said pins are successively pushed against the strands of the fabric and an adjustable bar forming a support for said cam plate, by which it is held against said pins, substantially as described.

4. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a pair of separator bars, of a series of sliding pins held in one of said bars and adapted to bear against the strands of the woven fabric, means for raising said pins in the separator bar and a series of projecting spurs extending from said separator bar and arranged relatively to said sliding pins so as to enter the meshes of the fabric and hold the strands of the fabric over the ends of said sliding pins, substantially as described.

5. In a machine for inserting diagonal strips in woven cane fabric, the combination with a pair of separator bars and a strand needle passing between said bars, of a series of sliding pins held in one of said separator bars, a sliding cam plate by which said pins are successively pushed against the strands of the woven fabric, said sliding pins having two projecting lips arranged to bear against the strands of the fabric and having a channel between said lips to receive the strand needle, whereby the strands of the fabric are raised on each side of the needle, substantially as described.

6. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a pair of separator bars and a strand needle passing between said bars, of a series of sliding

pins held in one of said separator bars, and arranged to bear against the strands of the woven fabric, said pins having diametrical channels in the ends next the fabric to allow the needle to pass, and a cam plate passing against the opposite ends of said pins, said needle and said cam plate having a simultaneous movement by which the sliding pins are successively raised, as the point of the needle enters the channel in the pin, substantially as described.

7. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a pair of separator bars and a strand needle passing between said bars, of a series of sliding pins held in one of said separator bars, said pins having diametrical channels in their ends with the bottom wall of said channels adapted to strike the strand needle and raise the same, and a cam plate acting against said pins to raise them successively against said strand needle, substantially as described.

8. In a machine for inserting diagonal strips in a woven cane fabric, the combination with a pair of separator bars, and a strand needle passing between said bars, of a series of strand lifting devices held in one of said separator bars and connected mechanism for operating said strand lifting devices successively and in correspondence with the movement of the needle, substantially as described.

9. In a machine for inserting diagonal strips in a woven cane fabric, the combination of a pair of separator bars, of a series of sliding pins held in one of said bars, a way or track for a needle carrier, a needle carrier moving along said way, a strand needle held by said carrier and arranged to pass between said bars and cam plate held by said needle carrier and extending beneath said sliding pins, whereby said pins are raised successively in correspondence with the forward movement of the needle, substantially as described.

Dated this 15th day of May, 1894.

FRANK H. BANCROFT.  
HENRY M. RICH.

Witnesses:

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