

No. 795,353.

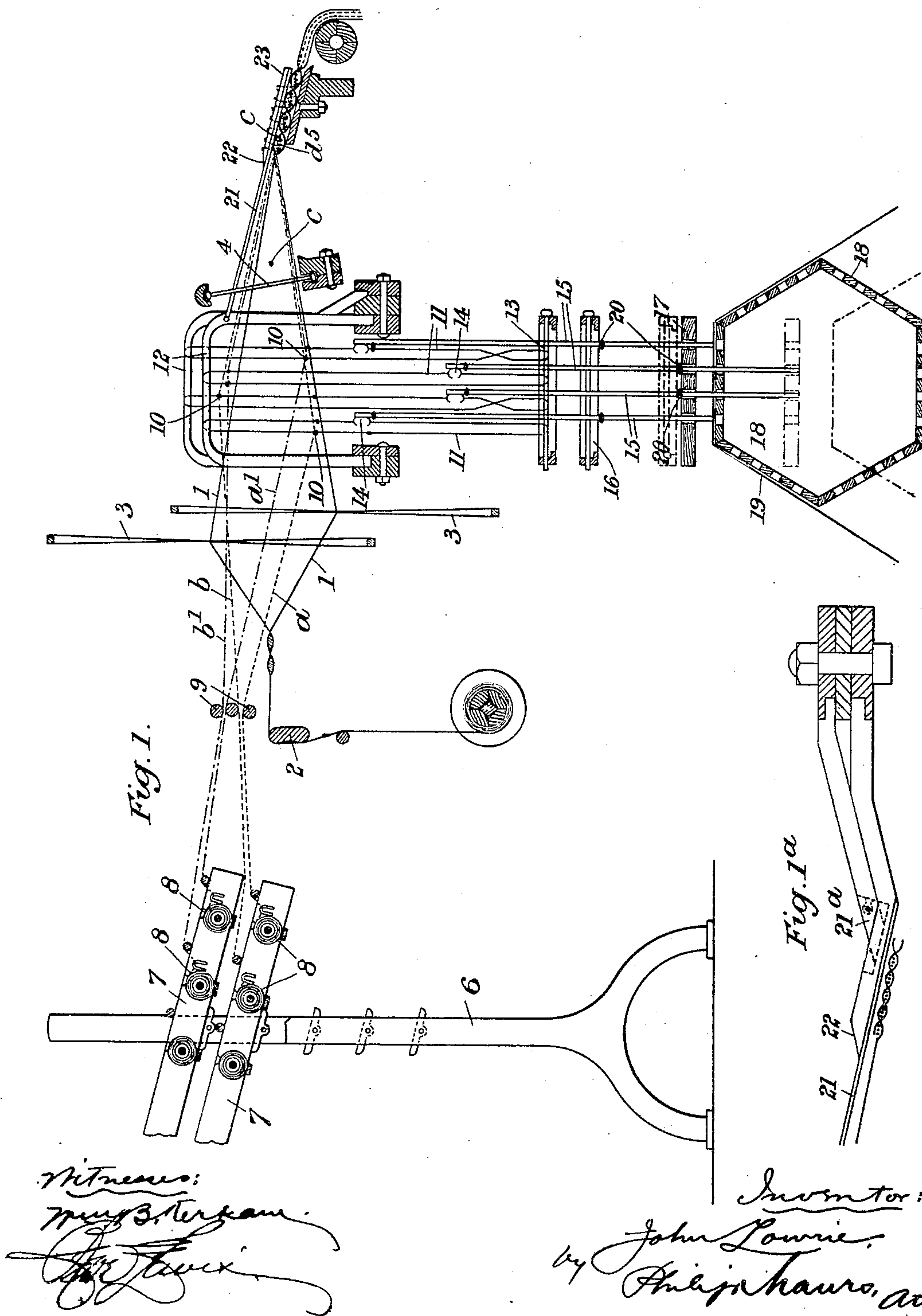
PATENTED JULY 25, 1905.

J. LOWRIE.

LOOM FOR WEAVING LOOPED AND CUT PILE FABRICS.

APPLICATION FILED OCT. 24, 1902.

5 SHEETS—SHEET 1.



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5 SHEETS—SHEET 2.

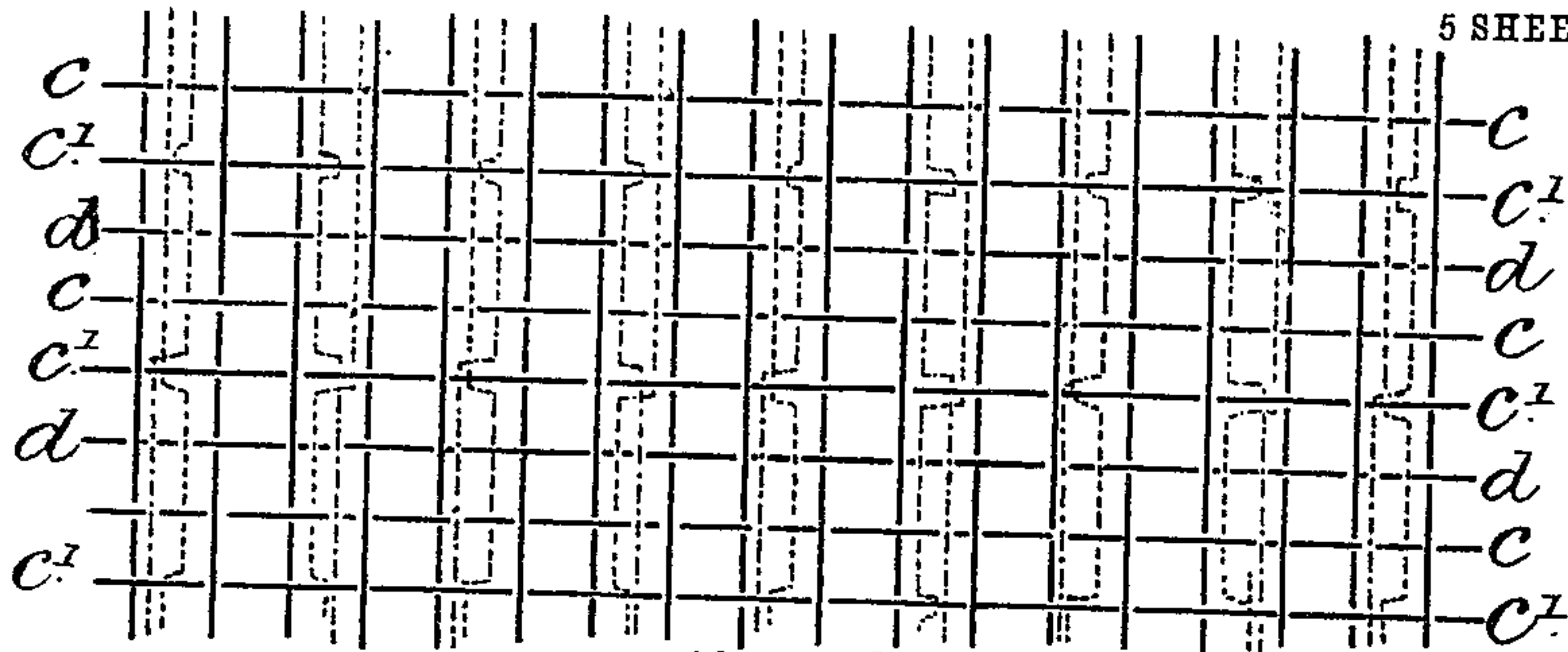


Fig. 1c

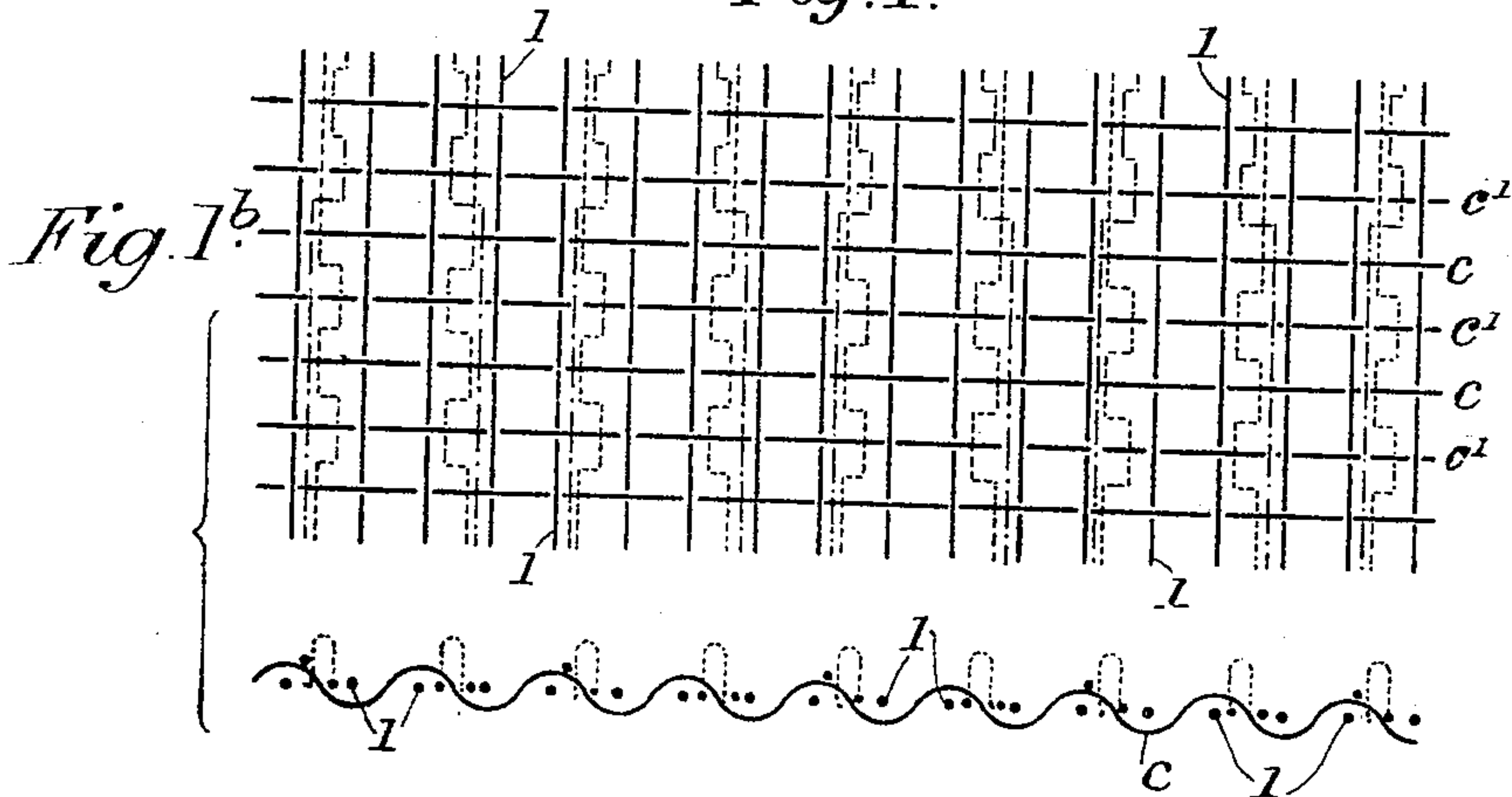


Fig. 1b

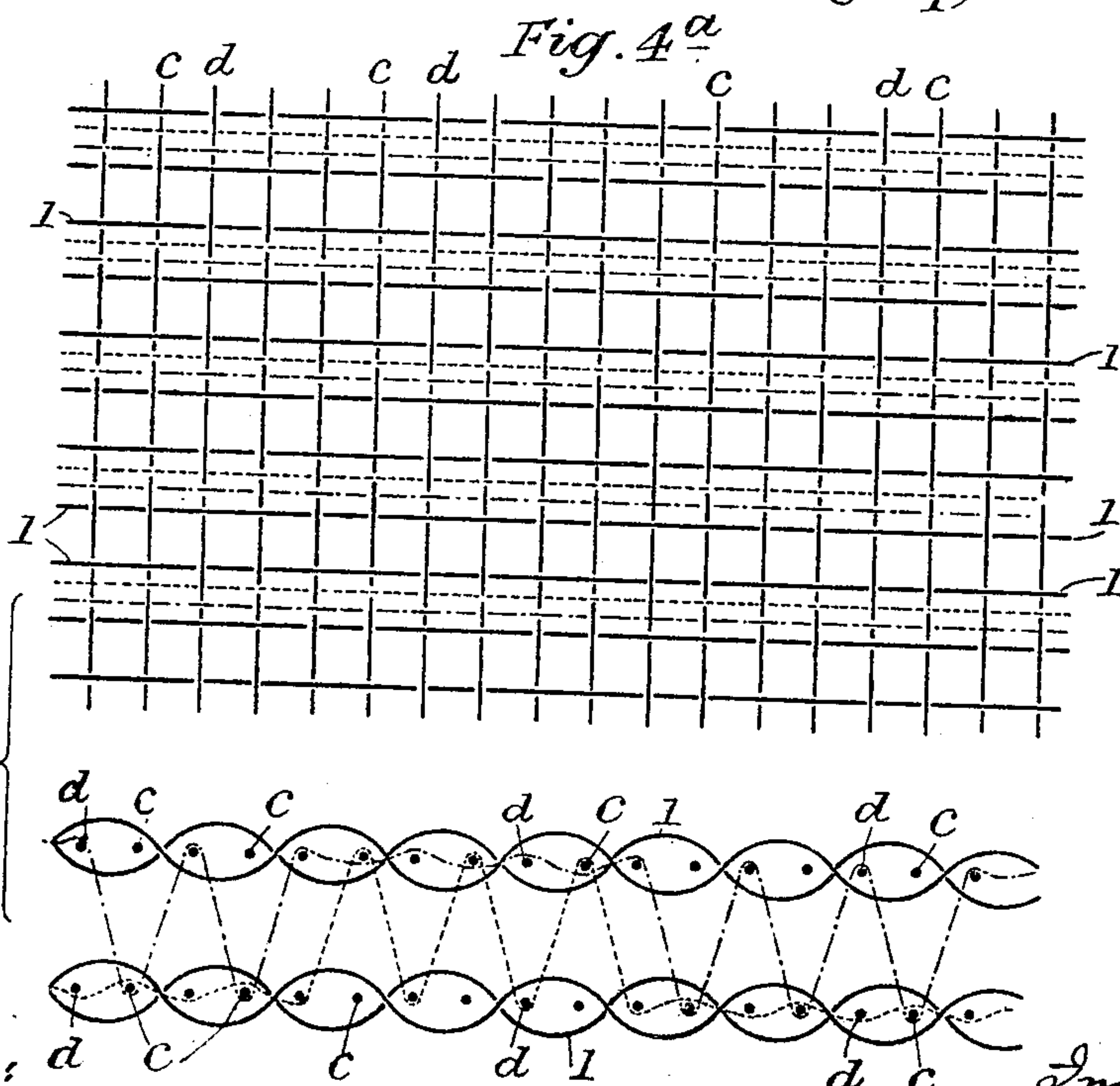


Fig. 4a

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5 SHEETS—SHEET 3.

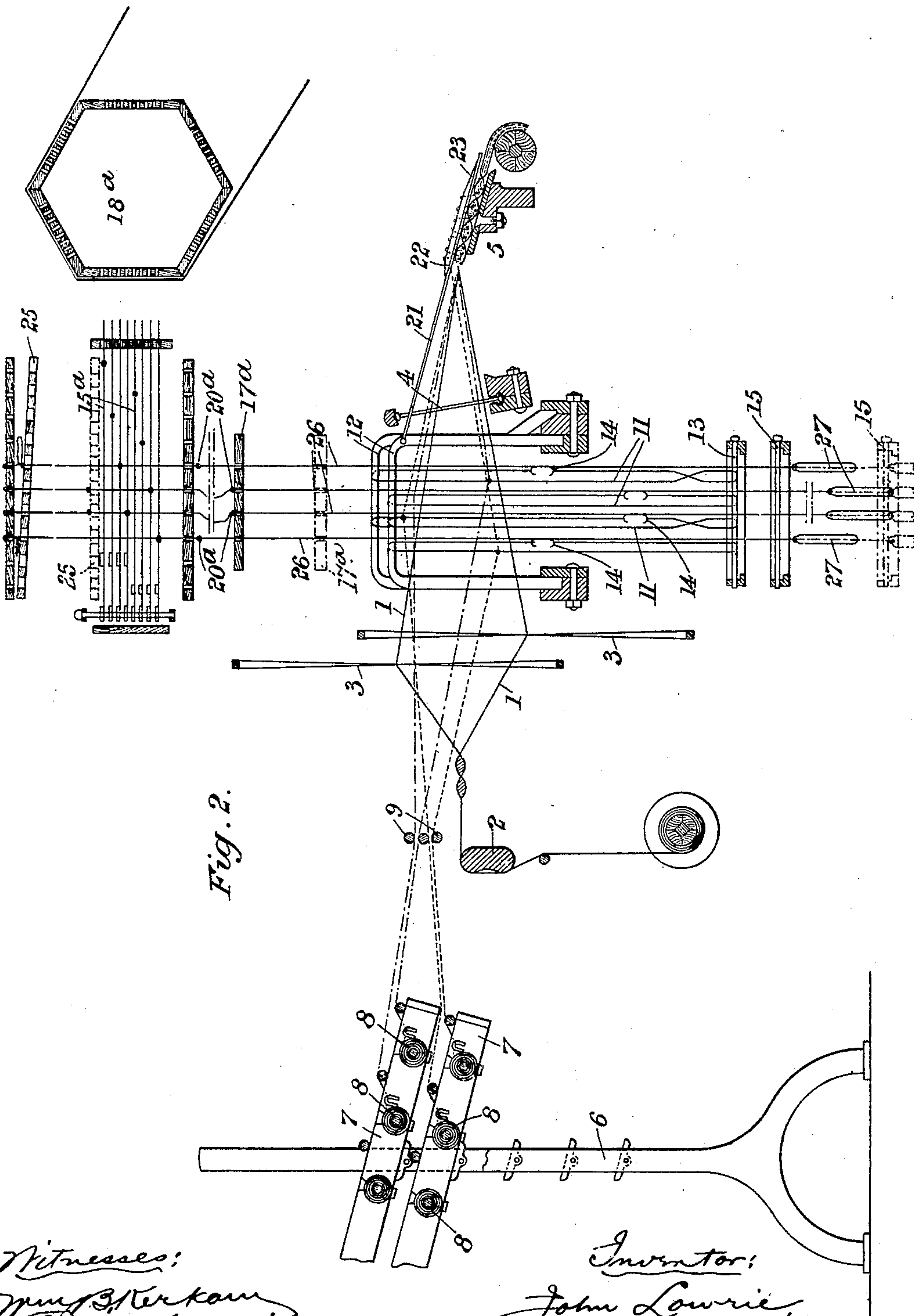


Fig. 2.

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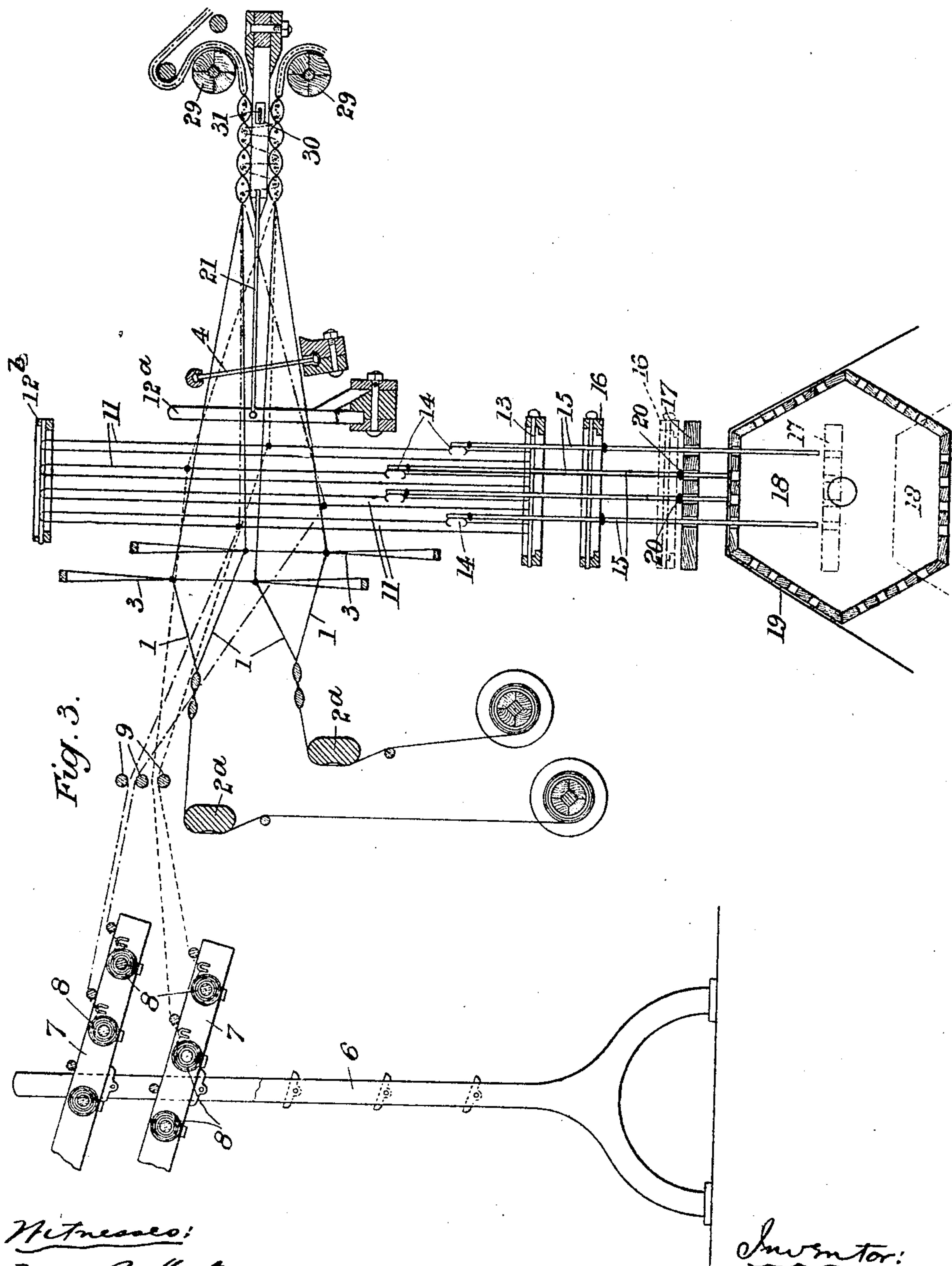
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5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.

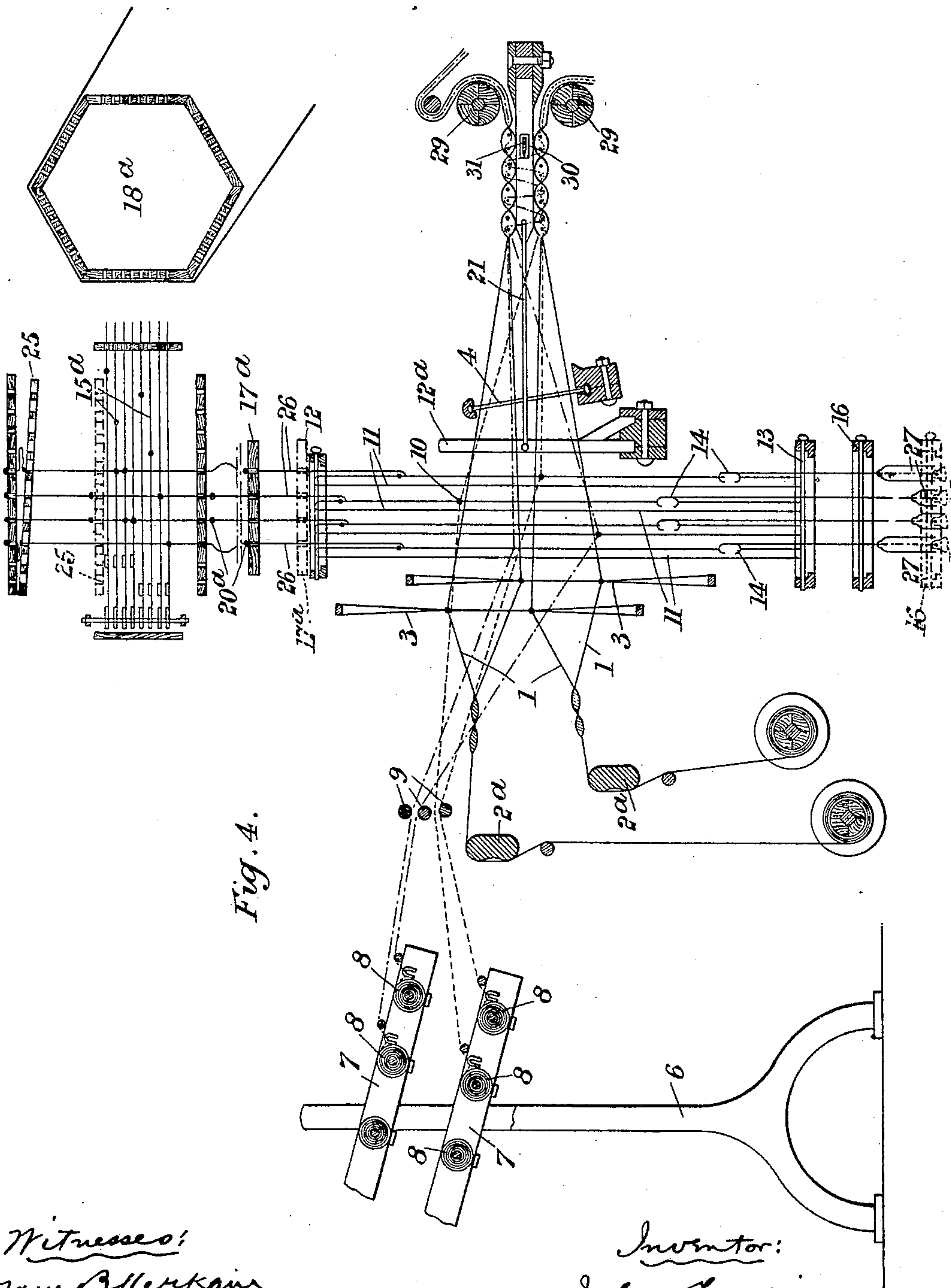


Fig. 4.

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UNITED STATES PATENT OFFICE.

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LOOM FOR WEAVING LOOPED AND CUT PILE FABRICS.

No. 795,353.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed October 24, 1902. Serial No. 128,635.

To all whom it may concern:

Be it known that I, JOHN LOWRIE, power-loom tuner, a subject of the King of Great Britain and Ireland, residing at 24 Victoria road, Bridgnorth, in the county of Salop, England, have invented certain new and useful Improvements in Looms for Weaving Looped and Cut Pile Fabrics, of which the following is a specification.

This invention consists of improvements in looms for weaving looped and cut pile fabrics whereby economy of yarn and increased speed in the manufacture are obtained.

In looped fabrics—such, for example, as Brussels carpets—as heretofore constructed the loops constituting the pile are formed side by side, so as to constitute ribs across the width of the fabric—that is, in the direction of the weft-yarns—the said loops being formed on wires, which are introduced in the sheds and withdrawn as the weaving proceeds.

According to this invention the insertion and withdrawal of wires is dispensed with, the loops being formed on fixed wires arranged with their lengths in the direction of the warp-yarns, the loops constituting the pile forming ribs in the direction of the length of the fabric instead of crosswise, as heretofore, and portions of the pile-warps which in the ordinary manufacture are buried in the ground of the fabric are by this invention saved.

In order that my invention may be clearly understood, I will describe the same with reference to the accompanying drawings, of which—

Figure 1 represents diagrammatically so much of a loom as is necessary to illustrate my invention according to one arrangement for weaving Brussels carpets. Fig. 2 is a similar view illustrating a modification. Fig. 1^a is a detail of one of the pile-wires provided with blades for cutting the pile. Fig. 1^b shows in plan and section an exaggerated view of the improved weave according to this invention. Fig. 1^c is a plan of a slight modification of the weave. Fig. 3 is a view similar to Fig. 1, showing an arrangement for weaving a double pile fabric to be afterward separated. Fig. 4 is a similar view showing a modification; and Fig. 4^a shows, drawn to an exaggerated scale, in plan and section the improved weave of the double fabric.

Referring to Fig. 1, the ground-warps 1 pass over a beam 2, through healds or heddles 3, operated in the usual manner by cams or

tappets on the cam-shaft of the loom, the said ground-warps passing thence through the reed 4 to the breast-beam 5. 6 is a support for creel-frames 7, two frames only being shown in the drawings (to prevent complication) for weaving what is known as “two-frame” patterns; but from one to six frame patterns can be similarly woven by providing creel-frames and needles accordingly. The pile-yarns pass from bobbins 8 in the creel-frames 7 through or between suitable guides 9 and according to this invention are threaded through eyes 10 in harness-cords 11 and through the reed 4 to the breast-beam 5. The harness-cords pass round upper and lower stationary bars 12 and 13 and have their ends connected to hooks 14 on the upper ends of vertical needles 15, thereby forming endless cords which are maintained practically taut by the horizontal bars 12 and 13, round which they pass. The needles 15 pass down between the bars of a grating 16 or through perforations in a board, to which grating or perforated board vertical up-and-down motions are imparted by cams or other suitable means. The needles 15 also pass down through perforations in what is known as a “cumber-board” 17 to which up-and-down movements are imparted by suitable means. Beneath the lower ends of the needles 15 is a perforated drum or cylinder 18, receiving from a cam on the cam-shaft or other suitable shaft in the loom movements of intermittent partial rotation and also rising-and-falling motions. On this drum or cylinder is mounted an endless chain or series of cards 19, perforated according to the pattern to be produced on the fabric being woven or according to the pile-yarns to be selected to form the loops, each card in the endless chain or series of cards being brought by the rotation of the drum or cylinder in succession into position beneath the needles 15, so that by the rising movement of the drum or cylinder the unperforated portion of the card will raise those needles which are opposite the said unperforated portions, while those needles which are situated opposite the perforations in the card will be unaffected by the rising of the cylinder. By the rising of the needles which are raised by the card the harness-cords connected to the said needles are caused to move round the horizontal bars 12 and 13 and carry the pile-yarns connected thereto over from one side to the opposite side of the upper

horizontal bars 12. The needles which are not raised by the cards are raised by the rising cumber-board acting on projections 20 on the needles high enough to bring the pile-yarns in connection therewith into position to be woven in the ground of the fabric with the ground-warps, but not sufficiently high to pass the pile-yarns over the upper horizontal bar 12.

In the drawings I have shown only four needles in the section for producing a two-pattern fabric; but if a more complicated pattern is to be produced the number of needles in the section will be correspondingly increased. The drum or cylinder 18, the cumber-board 17, and the grating 16 are shown by dotted lines in Fig. 1 in their lower or normal positions, while the full lines show these parts in their raised positions. The two outside needles are shown as having been raised by the unperforated portion of the card on the upper surface of the drum or cylinder 18, the eyes 10 in the harness-cords connected to these needles having been caused by the rising of the said needles to pass over the upper horizontal bar 12 from the position shown by dotted lines to that shown by full lines and carry with them the pile-yarns *a a'*, while the two other needles which have been raised by the cumber-board 17 from the position shown by dotted lines into the position shown by full lines have caused the eyes in the harness-cords connected to the said needles to move from the position shown by dotted lines to that shown by full lines, and so change the positions of the pile-yarns *b b'*, carried by the said harness-cords. Connected to and projecting from each of the upper horizontal bars 12 is a wire 21, on which the pile-loops are formed, the pile-warps which are passed over the horizontal bars 12 being by this movement passed over from one side to the opposite side of the said loop-forming wires 21. As shown in Fig. 1, the pile-yarn *a* has been passed from the front side to the back of the pile-wire 21, and the pile-yarn *a'* has been similarly passed over from back to front of the next pile-wire behind that over which the yarn *a* had been passed. The parts being in the position shown in Fig. 1 and a shed being formed in the ground-warps, the shuttle is passed through the shed and inserts a weft-yarn *c* therein, which is then beaten up by the reed 4, so as to bind in the ground-warps the loops so formed.

The set of loops having been beaten up by the reed 4 and bound in the ground-warps by the weft-shot *c*, the drum or cylinder 18, the cumber-board 17, and horizontal grating 16 are caused to descend, the said grating 16, by pressing on the projections 20 on the needles which were raised by the card on the cylinder, forcing the said needles downward sufficiently far to cause the harness-cords connected thereto to bring the pile-yarns *a a'*

which had been passed over the horizontal bars 12 up to but not over the horizontal bars 12. The shuttle then returns through the shed, inserting therein the weft-yarn *d*, which is then beaten up by the reed 4. The drum or cylinder 18, the cumber-board 17, and the horizontal grating 16 then descend to their lowest position, the said horizontal grating bringing the pile-yarns *a a' b b'* back to their former position, thereby forming another series of loops on the pile-wires 21. The shuttle then returns through the shed and inserts therein the weft *e'*, which is then beaten up by the reed 4, so as to bind the said second set of loops. The shed in the ground-warps *i* is then changed, the cylinder 18 rotated to bring another card into position beneath the needles, the cylinder 18, grating 16, and cumber-board 17 raised, and the operations hereinbefore described repeated, thereby producing the weave shown by Fig. 1^c. By this arrangement a single pile-yarn is doubled on the surface of the fabric, thereby producing by single-ply yarns a two-ply surface, such as is ordinarily produced by two-ply yarns. A four-ply surface or a six-ply surface can similarly be produced by two-ply yarns or by three-ply yarns, respectively. If desired, the shot of weft *d* may be dispensed with, in which case the drum or cylinder 18, cumber-board 17, and grating 16 are caused to return to their lowest position without dwelling, the weave then produced being that illustrated by Fig. 1^b. The outer ends of the pile-wires 21 are made thicker or broader than the other parts, the said thickened or broadened portions being tapered at each end, as shown at 22 and 23, so that when the loops are beaten by the reed 4 up the inner inclined ends 22 the said loops are tightened, while the outer inclined ends 23 permit of the loops passing freely off the wires. If the pile be required to be cut, the outer thickened or broadened ends of the wires 21 may be trough-shaped and in each trough a cutting-blade 21^a be fitted, as shown in Fig. 1^a, against the edge of which blades the loops are pressed and cut as the fabric is passing off the pile-wires.

Instead of arranging the cylinder 18 and pattern-cards 19 below the needles, as hereinbefore described, an ordinary jacquard cylinder 18^a and selecting-needles 15^a may be employed, as shown in Fig. 2, together with an ordinary lifting-board 25 for operating tail-cords 26, connected to the harness-cords 11, provided with weights 27, attached to the harness-cords, as shown in Fig. 2, to maintain the tail-cords taut. The operation of this arrangement is similar to that hereinbefore described, except that the pile-warps to be raised and passed over the horizontal bars 12 to form loops are selected by the selecting-needles 15^a of the jacquard and raised by the lifting-board 25 instead of by the cards themselves, as hereinbefore described. The cumber-board 17^a is

also in this arrangement situated above instead of below the horizontal bars 12 and acts on knots 20^a in the tail-cords 26 of the jacquard instead of on projections on the needles.

To weave double-pile fabrics to be afterward cut apart, two ground-warp supports 2^a and two work-beams 29 are employed, as shown in Fig. 3, one of each for the top fabric and one of each for the bottom fabric, two-ply yarns or three-ply yarns being employed for the pile, and the ground-warps 1 are connected to the healds or heddles 3, so as to simultaneously form and change the sheds in the two sets of ground-warps. The harness-cords 11, with eyes through which the pile-yarns pass, are carried on horizontal stationary bars 12^b and 13, as before described; but in this case the pile-yarns are not passed over the said horizontal bars 12^b, but are moved by the rising and descending movements of the needles 15 up and down stationary bars 12^a, the loops in the pile-warps being formed on top and bottom sides of the stationary pile-wires 21 by the raising and lowering of the pile-warps against the sides of the said vertical bars 12^a, to which bars the pile-wires 21 are connected, and the sets of loops formed are bound alternately in the upper and lower sets of ground-warps by shuttles carrying wefts into the two sheds, as shown in Figs. 3, 4, and 4^a, which wefts are beaten up by the reed 4, thereby weaving the desired double fabric. In the outer end of each of the stationary wires is an opening 30, in which is caused to reciprocate cutting-blades or a cutting-blade 31 to divide the double fabric as it passes along the said stationary wires.

The arrangement illustrated in Fig. 4 is similar to that illustrated by Fig. 3; but instead of operating the harness-cords by means of needles the said harness-cords are operated by the lifting-board 25 of jacquard mechanism similar to that illustrated in Fig. 2, the cumber-board 17^a being also arranged above the horizontal bars 12, on which the harness-cords 11 move. The tail-cords 26 of the jacquard are connected to the harness-cord, to which are also attached weights 27 to maintain the tail-cords taut, as hereinbefore described, and to cooperate with the grating 16 to change the position of the pile-yarns when the said harness-cords are not retained in position by the cumber-board and the lifting-board. The other parts of this arrangement which correspond to similar parts in the before-described arrangements are designated by corresponding reference characters.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a loom for weaving pile fabrics the combination with fixed pile-wires of harness with eyes through which the pile-yarns pass, each harness-cord forming a continuous loop,

horizontal bars inside the loops by which the said loops are distended, and means whereby the said harness-cords are caused to move to and fro round the said horizontal bars; substantially as and for the purpose hereinbefore described.

2. In a loom for weaving pile fabrics the combination with fixed pile-wires and harness having eyes through which the pile-yarns pass, each harness-cord being in the form of a continuous loop, fixed horizontal bars inside the said loops for distending the same; a rod or needle connected to each harness-cord, a perforated drum or cylinder arranged beneath the rods or needles, pattern-cards mounted on the drum or cylinder whereby by the movement of said cylinder the harness-cords pass the pile-yarns alternately from one side to the other of the said horizontal bars.

3. In a loom for weaving pile fabrics, the combination with fixed pile-wires, harness having eyes through which the pile-yarns pass, each harness-cord being in the form of a continuous distended loop, a needle connected to each harness-cord a perforated intermittently rotating and reciprocating drum or cylinder opposite the ends of the needles, pattern-cards mounted on the drum or cylinder for moving longitudinally those needles which are opposite the unperforated portions of the card on the drum or cylinder; of a movable perforated board or grating through which the needles pass, and projections on the needles below the perforated board or grating to be engaged by the latter for returning the needles to their original position.

4. In a loom for weaving pile fabrics the combination with fixed pile-wires, harness with eyes through which the pile-yarns pass, each harness-cord being in the form of a continuous distended loop, a needle connected to each harness-cord, a perforated drum or cylinder arranged below the ends of the needles, a series of pattern-cards carried by the drum or cylinder a vertically-movable grating through which the needles pass and projections on the needles below the said grating; of a cumber-board through which the needles pass the said cumber-board being situated between the projections on the needles and the drum or cylinder whereby by the movement of said cylinder a part of the pile-yarns are passed over the pile-wires and by the movement of the cumber-board other pile-yarns are woven in the ground of the fabric.

5. In a loom for weaving pile fabrics the combination of fixed pile-wires; harness with eyes through which the pile-yarns pass, needles connected to the harness-cords, projections on the needles, a vertically-movable drum or cylinder carrying pattern-cards, a vertically-movable cumber-board which acts on the projections on the needles to raise the said needles; and operate the harness-cords connected thereto so as to move the pile-yarns

into position to be woven in the ground of the fabric while those needles raised by the drum or cylinder operate the harness-cords connected to the said needles so as to move the pile-yarns in connection therewith over from one side to the other side of the pile-wires so as to form loops thereon, and a vertically-movable perforated board or grating which in its descent acts on the projections on the needles so as to return them into the position from which they had been moved by the cum-

ber-board and the drum or cylinder and in doing so form another series of loops on the pile-wires substantially as hereinbefore described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN LOWRIE.

Witnesses:

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ARCHIBALD GEORGE BARLOW.