

No. 733,434.

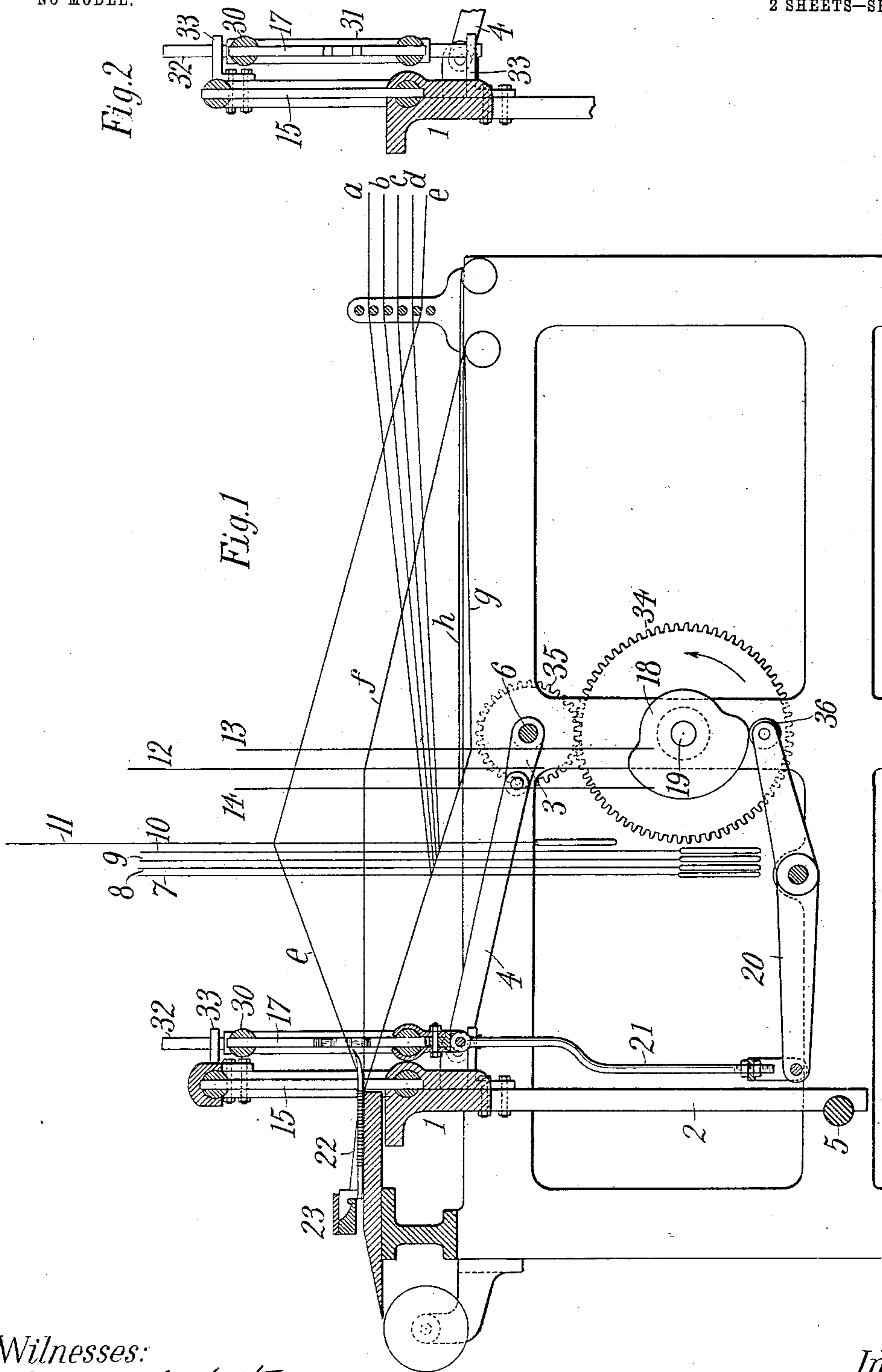
PATENTED JULY 14, 1903.

N. M. SHINN.  
LOOM.

APPLICATION FILED FEB. 14, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

Raphaël Ketter  
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Inventor

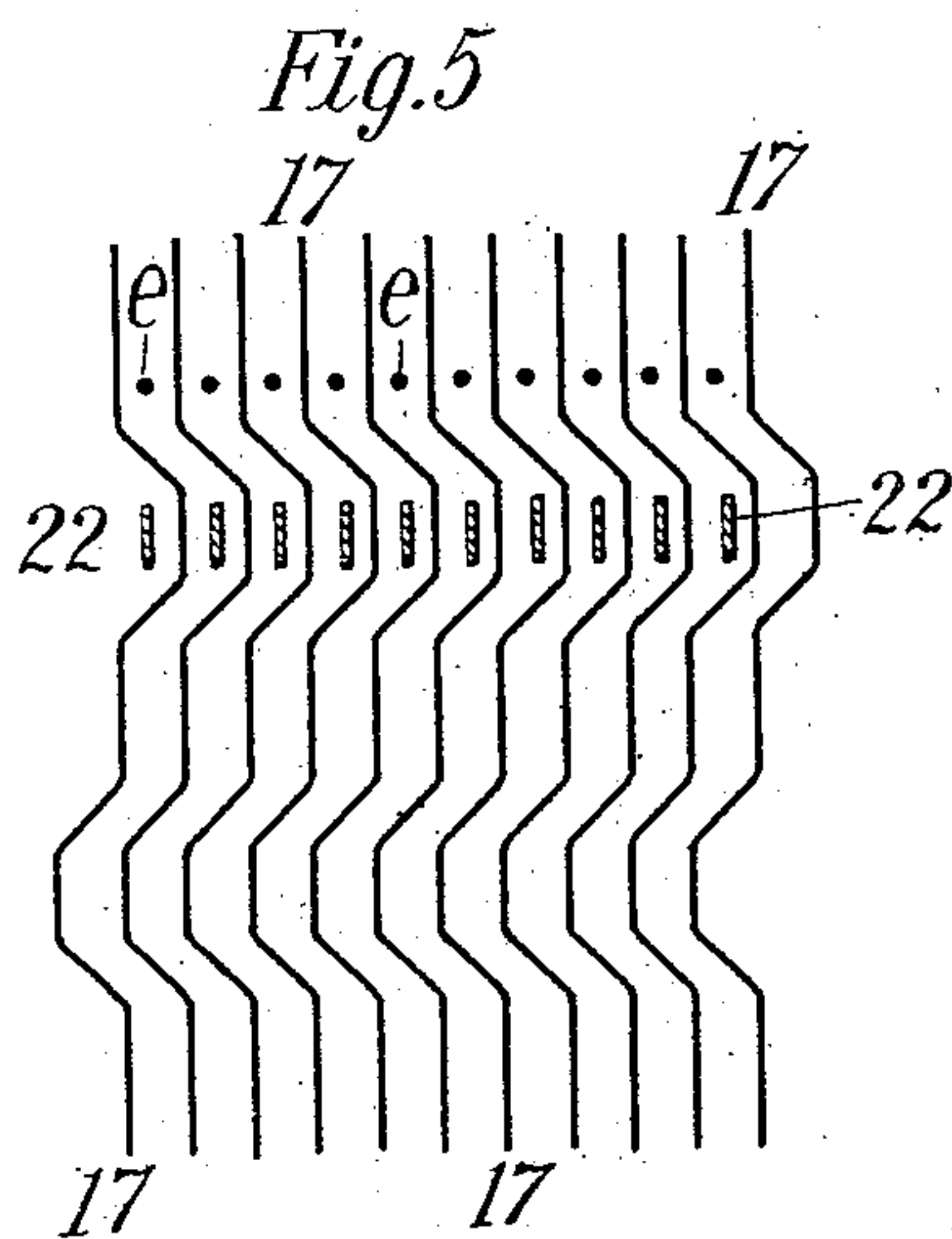
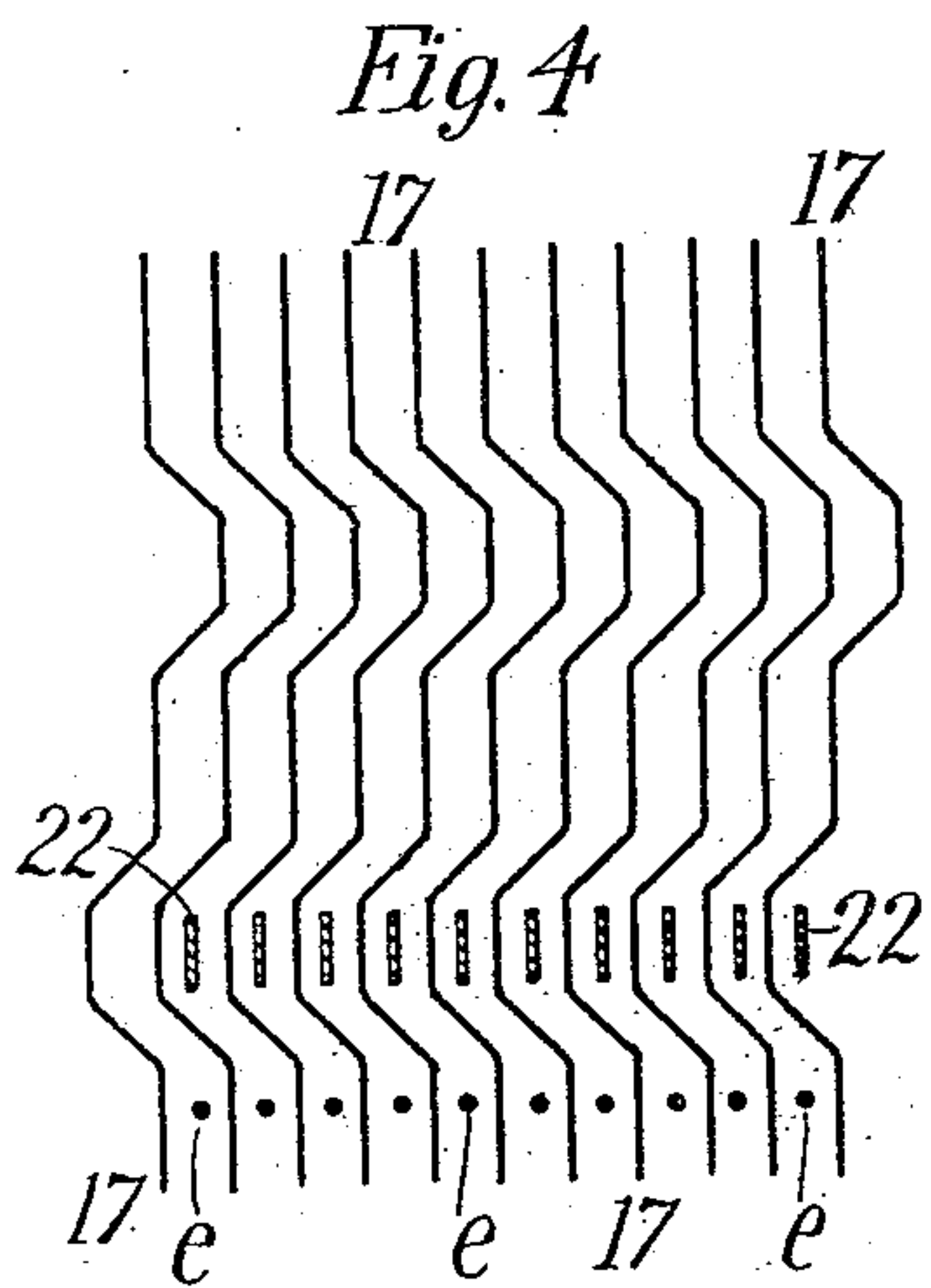
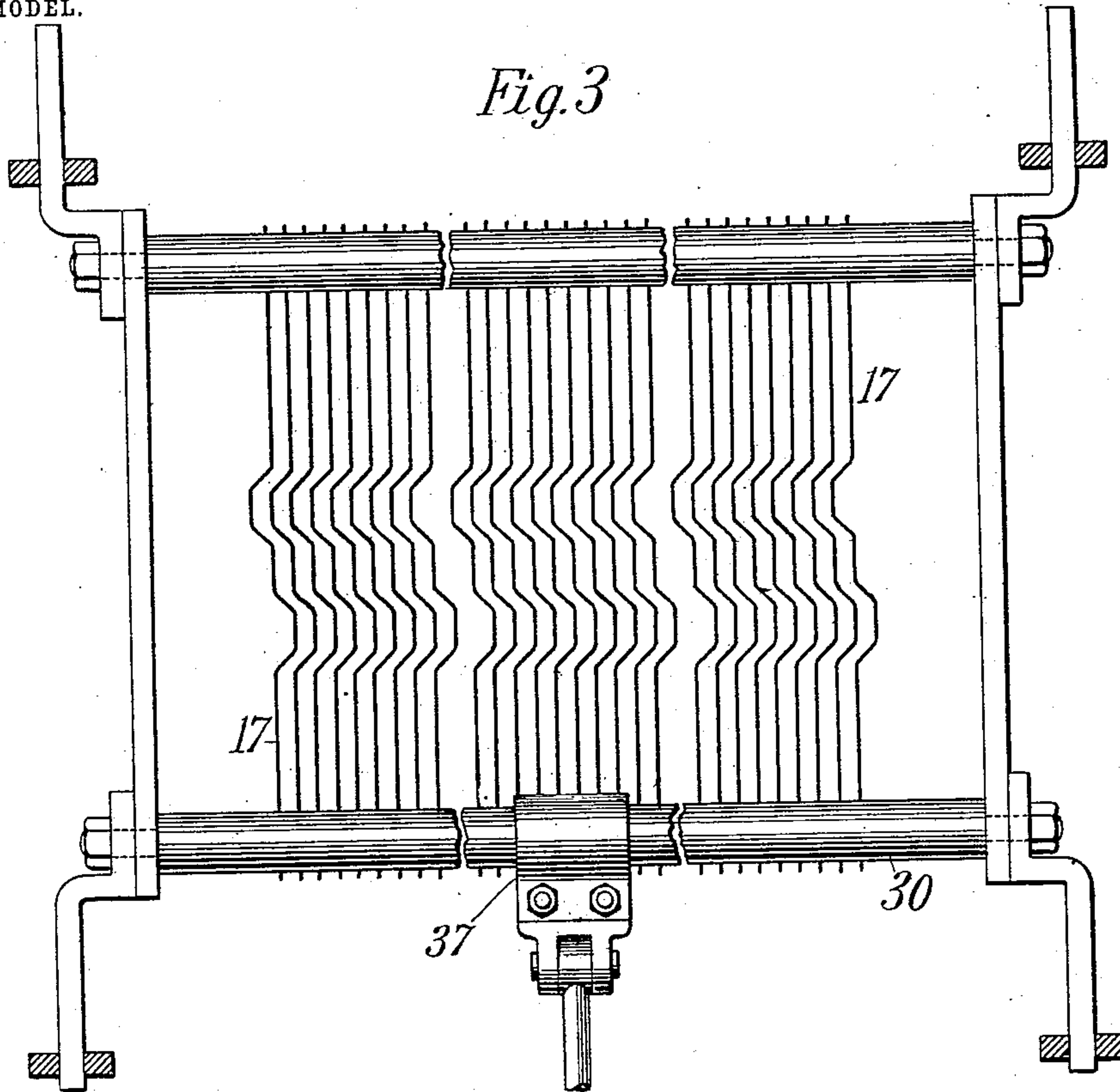
Nathaniel Marcus Shinn  
by Henry D. Williams Atty

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LOOM.

APPLICATION FILED FEB. 14, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:  
*Raphael Petter*  
*Livingston Currier*

Inventor  
*Nathaniel Marcus Shinn*  
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# UNITED STATES PATENT OFFICE.

NATHANIEL MARCUS SHINN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR  
TO ROBERT DORNAN AND THOMAS BENTON DORNAN, OF PHILADELPHIA, PENNSYLVANIA.

## LOOM.

SPECIFICATION forming part of Letters Patent No. 733,434, dated July 14, 1903.

Application filed February 14, 1903. Serial No. 143,323. (No model.)

*To all whom it may concern:*

Be it known that I, NATHANIEL MARCUS SHINN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to looms, and more particularly to means for crossing or laterally deflecting the warp-threads. According to my invention this operation is effected by a crossing-reed, which is actuated vertically or up or down and is provided with guide-surfaces which laterally deflect the warp-threads during movement of the warp-threads up or down relatively to the crossing-reed.

The objects of my invention are simplicity of construction and operation and certainty and reliability of operation.

I will now describe the construction of the pile-fabric loom embodying my invention illustrated in the accompanying drawings and will thereafter point out my invention in claims.

Figure 1 is a longitudinal vertical section showing the principal parts of the loom. Fig. 2 is a sectional detail of the crossing-reed and adjacent parts. Fig. 3 is a detail front elevation of the crossing-reed. Figs. 4 and 5 are diagrammatic views showing dents of the crossing-reed in upper and lower positions relatively to the longitudinal pile-wires.

The drawings illustrate only such parts of a loom as are required for an understanding of my invention. The figuring-warps *a*, *b*, *c*, *d*, and *e* are controlled by a figuring-harness comprising cords 7, 8, 9, 10, and 11, which would be actuated by suitable jacquard or other mechanism. The binder-warps *f* and *g* and a stuffer-warp *h* are controlled by heddles 12, 13, and 14, respectively.

The lay 1 is carried on swords 2 on a rock-shaft 5 and is actuated through connecting-arms 4 by cranks 3 on the main shaft 6. The reed 15 may be of any usual or suitable construction. The longitudinal pile-wires 22 are clamped at their front ends upon a cross-bar

23 and extend rearwardly, so as to penetrate the reed when the reed is in extreme forward position, but project therethrough only a sufficient distance to afford a protruding part over which the pile-forming figuring-warps may be crossed or looped. This construction of pile-wires is not of my invention, but co-operates with the crossing-reed of my invention, which I will now describe.

The crossing-reed, as shown in the drawings, has dents 17, secured at their ends upon rods 30, these rods being clamped at their ends to end bars 31 and to guide-pins 32, located at the corners of this frame, and these guide-pins are fitted to slide in guides 33 on the lay, so that the crossing-reed is carried by the lay, but has vertical movement relatively thereto, and the up-and-down movement of the crossing-reed is effected by a cam 18 on a cam-shaft 19, this cam-shaft being geared to the main shaft 6 by reducing-gears 34 35, secured to the respective shafts, so that the cam-shaft makes one-half a revolution to each revolution of the main shaft. A cam-roller 36, working against the face of the cam, is carried on the rock-lever 20, which is joined by the connecting-rod 21 to the crossing-reed, the connecting-rod having an adjustable connection to a yoke pivoted on the rock-lever at its lower end and being pivotally connected to a clamp 37, embracing the lower cross-bar 30 of the crossing-reed.

The crossing-reed has laterally-deflected or cam faces which guide the warp-threads lifted to form the pile, so that they pass upward on one side of the longitudinal pile-wires and downward on the other side thereof and are thus laterally deflected and looped or crossed over the longitudinal pile-wires, the crossing-reed being shifted upward or downward between the up and down movements of the pile-forming warp-threads, so as to interpose different guide-surfaces for the two movements. In the embodiment of my invention shown in the drawings two oppositely-projecting cam faces or guides are provided one above the other on each dent of the crossing-reed, and the crossing-reed is shifted only between the up and the down movements of the pile-forming



threads, so that the surfaces which guided the pile-forming warp-threads in the downward movement of one pile-forming operation will guide the warp-threads lifted for the next pile-forming operation in their upward movement, and thus successive plies will be crossed or looped over the pile-wires in opposite directions. Further, by deflecting the pile-forming threads in one direction during the upward movement thereof and in the opposite direction during the downward movement thereof the total lateral movement of the thread may be divided between these two deflecting movements. In Figs. 4 and 5 the operations of the crossing-reed are diagrammatically illustrated. Fig. 4 shows the crossing-reed dents in upper position and shows the pile-forming threads *e* before they are lifted to form the pile. It is obvious that these threads when lifted will be deflected to the left of the pile-wires 22. Fig. 5 shows the crossing-reed dents in lower position and shows the pile-forming threads *e* after they have been lifted to form the pile. It is obvious that when these threads are moved down they will be deflected to the right of the longitudinal pile-wires 22. This upward and downward movement will have crossed or looped the pile forming threads over the pile-wires from left to right. After the completion of this pile-forming operation the crossing-reed has no further up or down movement imparted to it until after the lifting of the pile-threads for the next pile-forming operation, and it is obvious that the threads lifted for such operation will be deflected to the right. The crossing-reed is then shifted upwardly to the position shown in Fig. 4, and the downward movement of the pile-forming threads then takes place, the threads being deflected to the left, and thus looped or crossed from right to left over the pile-wires. The operations first described will then be repeated, and so on.

Fig. 1 shows the lay in extreme forward position, the figuring warp-threads *e* lifted to form pile, and the crossing-reed in upper position, having been just lifted to that position by the action of the cam 18. The crossing-reed is here in position for the downward movement of the pile-forming threads, and the pile-threads will be crossed from right to left, and the crossing-reed will not be again shifted until after the next lift of thread to form pile and as the lay is nearly forward on its next stroke.

It is of course obvious that any of the figuring-threads may be lifted to form pile and that the figuring-threads may be controlled by any suitable means and that various modifications may be made in details of construction within the spirit and scope of my invention.

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

1. In a loom, the combination with means for forming the sheds of a crossing-reed having laterally-deflected guide-surfaces and means for moving the crossing-reed vertically.
2. In a loom, the combination with a lay and means for forming the sheds, of a crossing-reed carried by the lay and movable vertically relatively thereto, the crossing-reed having laterally-deflected guide-surfaces and means for actuating the lay and crossing-reed.
3. In a loom, the combination with means for forming the sheds, of a crossing-reed having laterally-deflected dents and means for shifting the crossing-reed up and down.
4. In a loom, the combination with a lay, and means for forming the sheds, of a crossing-reed carried by the lay and movable up and down relatively thereto, the crossing-reed having laterally-deflected dents, and means for actuating the lay and crossing-reed.
5. In a loom, the combination with means for forming the sheds, of a crossing-reed having oppositely-arranged laterally-deflected guide-surfaces at different heights therein, and means for shifting the crossing-reed up and down.
6. In a loom, the combination with a lay, and means for forming the sheds, of a crossing-reed carried by the lay and movable up and down relatively thereto, the crossing-reed having oppositely-arranged laterally-deflected guide-surfaces at different heights therein, and means for actuating the lay and crossing-reed.
7. In a pile-fabric loom, the combination with longitudinal pile-wires and means for raising and lowering the pile-forming threads and forming the sheds, of a crossing-reed having laterally-deflected guide-surfaces and means for shifting the crossing-reed up and down.
8. In a pile-fabric loom, the combination with longitudinal pile-wires, a lay, and means for raising and lowering the pile-forming threads and forming the sheds of a crossing-reed carried by the lay and movable up and down relatively thereto, the crossing-reed having laterally-deflected guide-surfaces, and means for actuating the lay and crossing-reed.
9. In a pile-fabric loom, the combination with longitudinal pile-wires and means for raising and lowering the pile-forming threads and forming the sheds, of a crossing-reed having dents oppositely laterally deflected at different heights thereon, and means for shifting the crossing-reed up and down.
10. In a pile-fabric loom, the combination with longitudinal pile-wires, a lay, and means for raising and lowering the pile-forming threads and forming the sheds, of a crossing-reed carried by the lay and movable up and down relatively thereto, the crossing-reed having dents oppositely laterally deflected at different heights thereon, and means for actuating the lay and crossing-reed.



11. In a pile-fabric loom, in combination,  
longitudinal pile-wires, a lay, means for rais-  
ing and lowering the pile-forming threads  
and forming the sheds, a crossing-reed mov-  
5 able up and down in guides on the lay, the  
crossing-reed having dents oppositely later-  
ally deflected at different heights thereon, a  
cam, a rock-lever actuated by the cam, a con-  
necting-rod joining the rock-lever and cross-

ing-reed, and means for actuating the lay, so  
substantially as set forth.

In testimony whereof I have affixed my sig-  
nature in presence of two witnesses.

NATHANIEL MARCUS SHINN.

Witnesses:

WILLIAM F. LARER,  
GEORGE W. GOLDEN.