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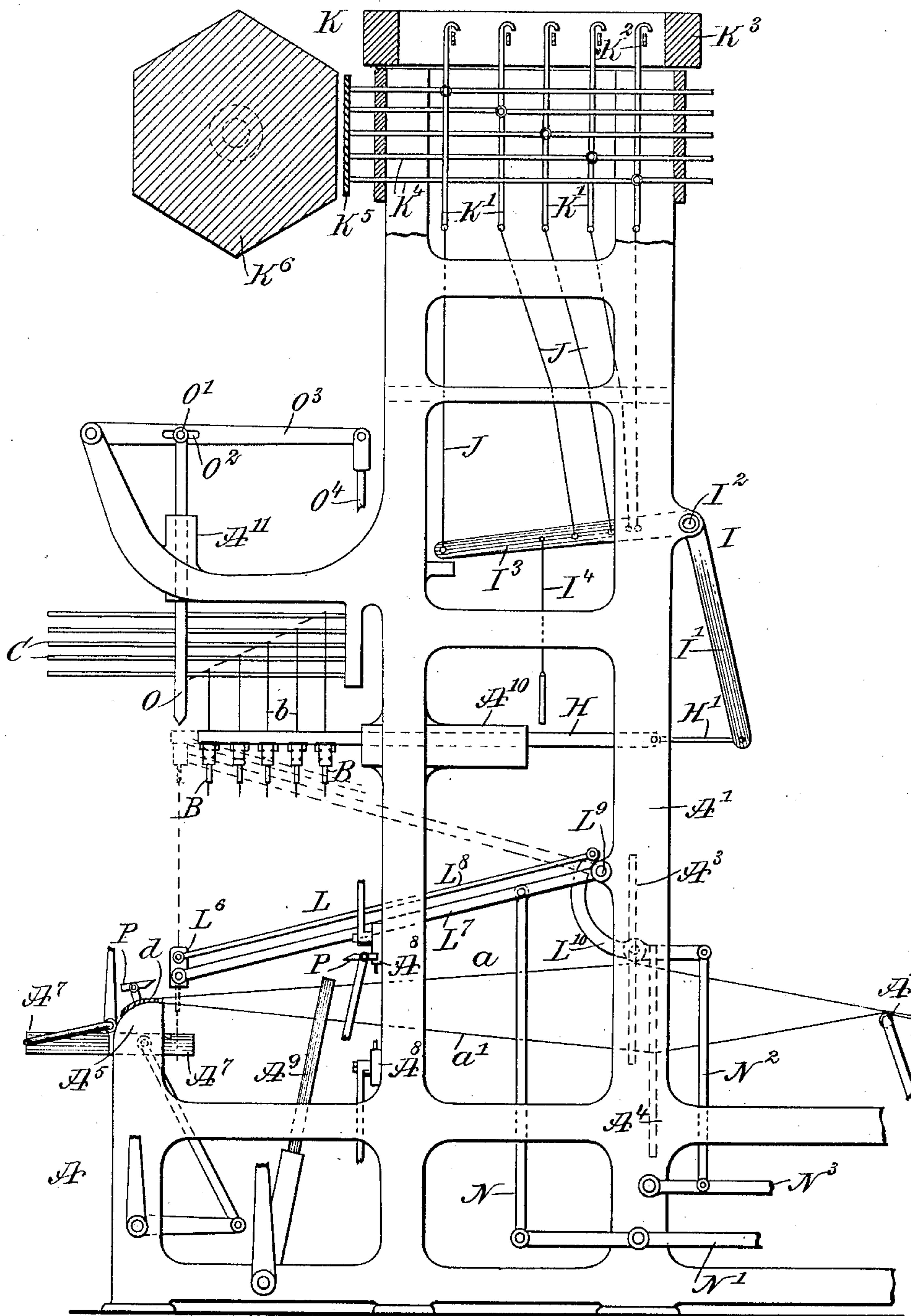
J. K. DALKRANIAN.

PATENTED MAR. 17, 1908.

# YARN SELECTING MECHANISM FOR TUFTED FABRIC LOOMS.

APPLICATION FILED APR. 19, 1905.

4 SHEETS—SHEET 1.



**WITNESSES:**

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**III.1**

*James Karmi Dalkranian*

BY

*Mumma*  
ATTORNEYS

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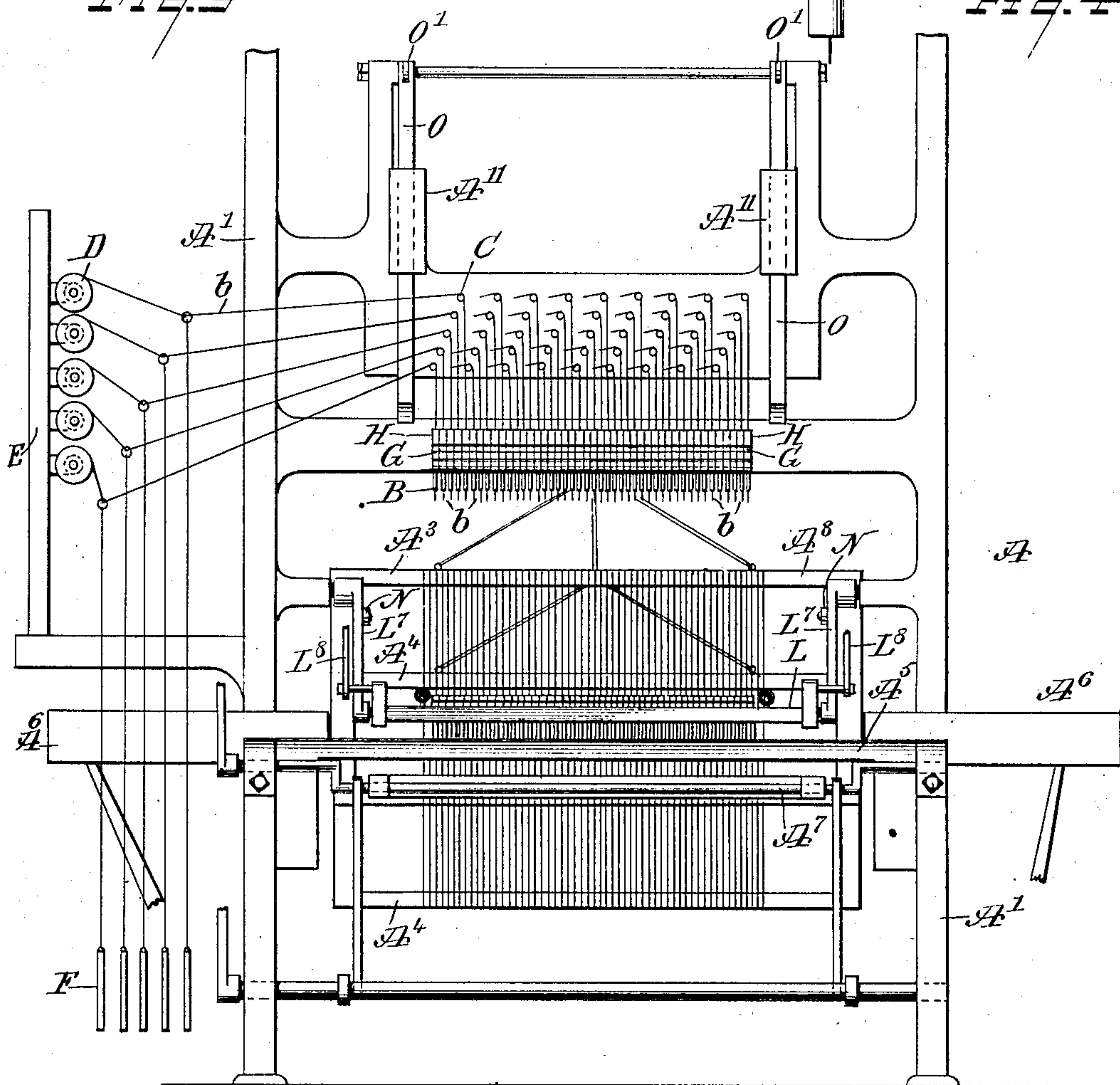
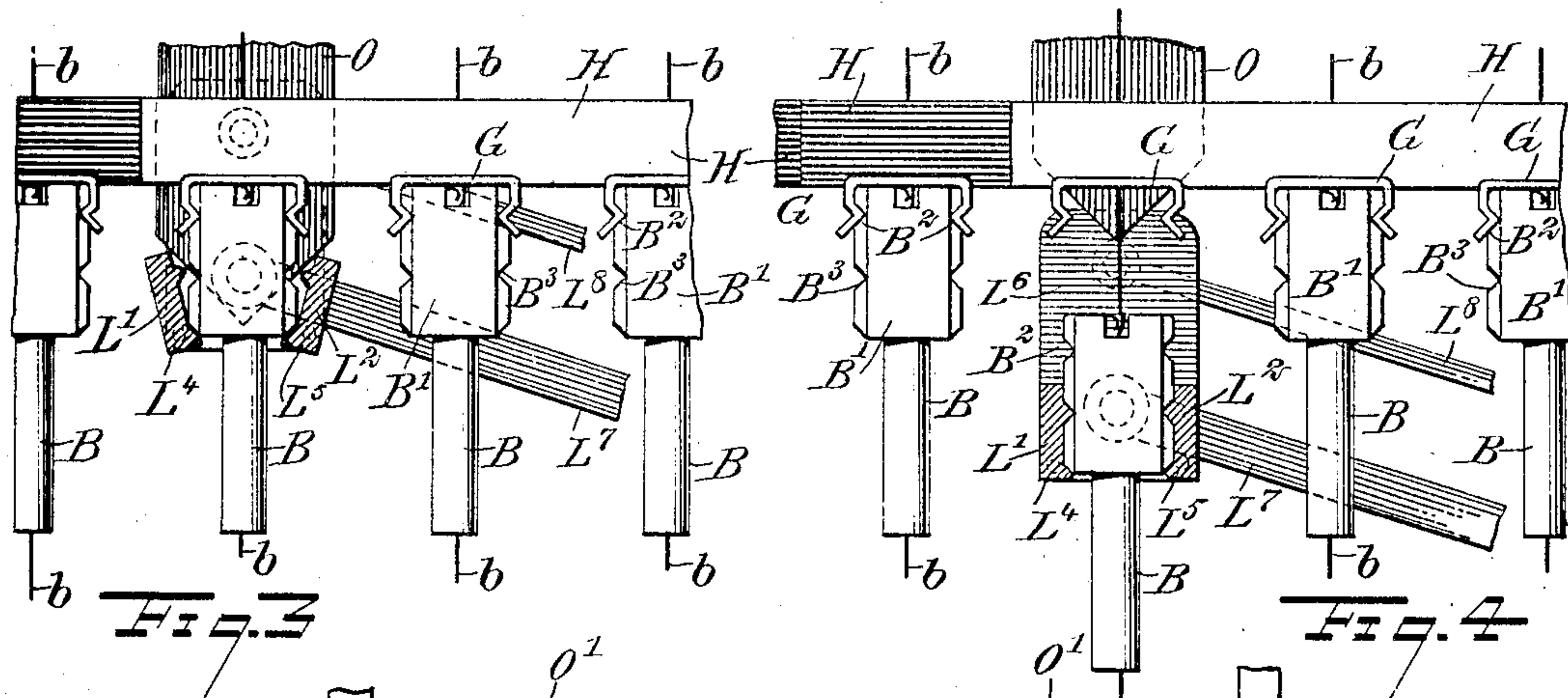
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4 SHEETS—SHEET 2.



WITNESSES:

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*Fig. 2*

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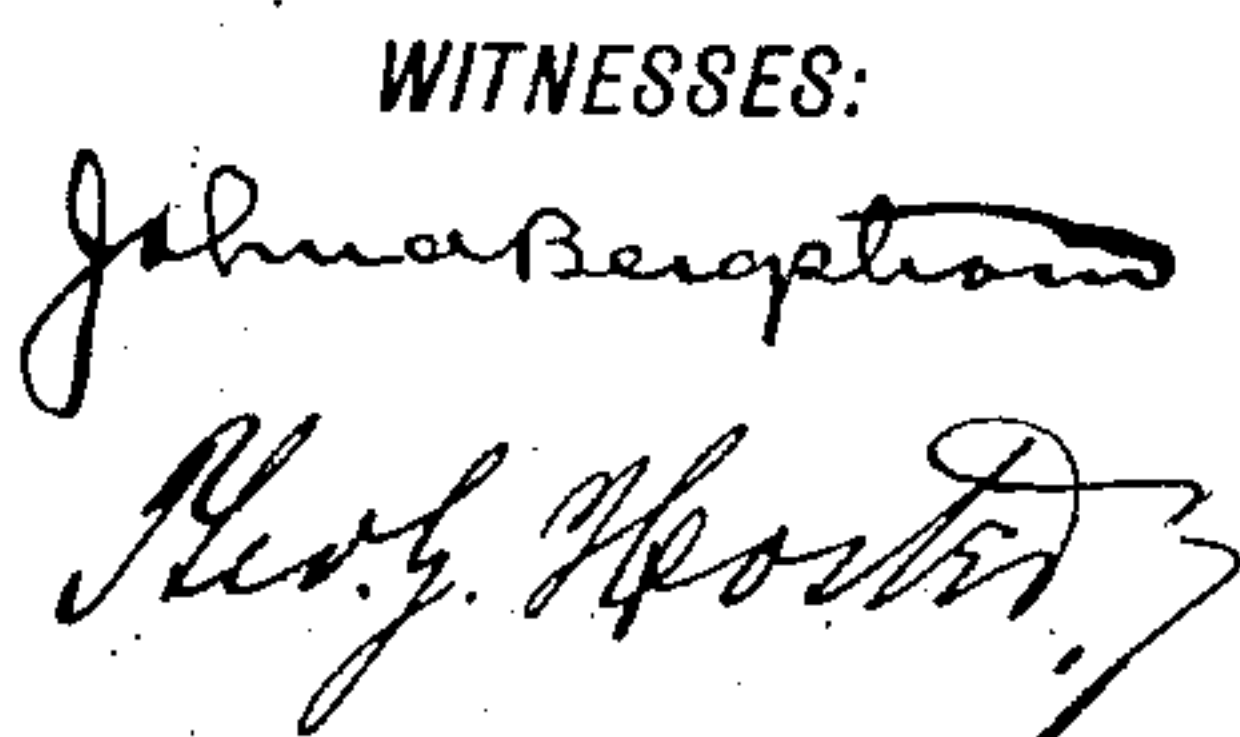


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APPLICATION FILED APR. 19, 1905.

4 SHEETS—SHEET 3.



*INVENTOR*

*James Karimi Dalkranian*

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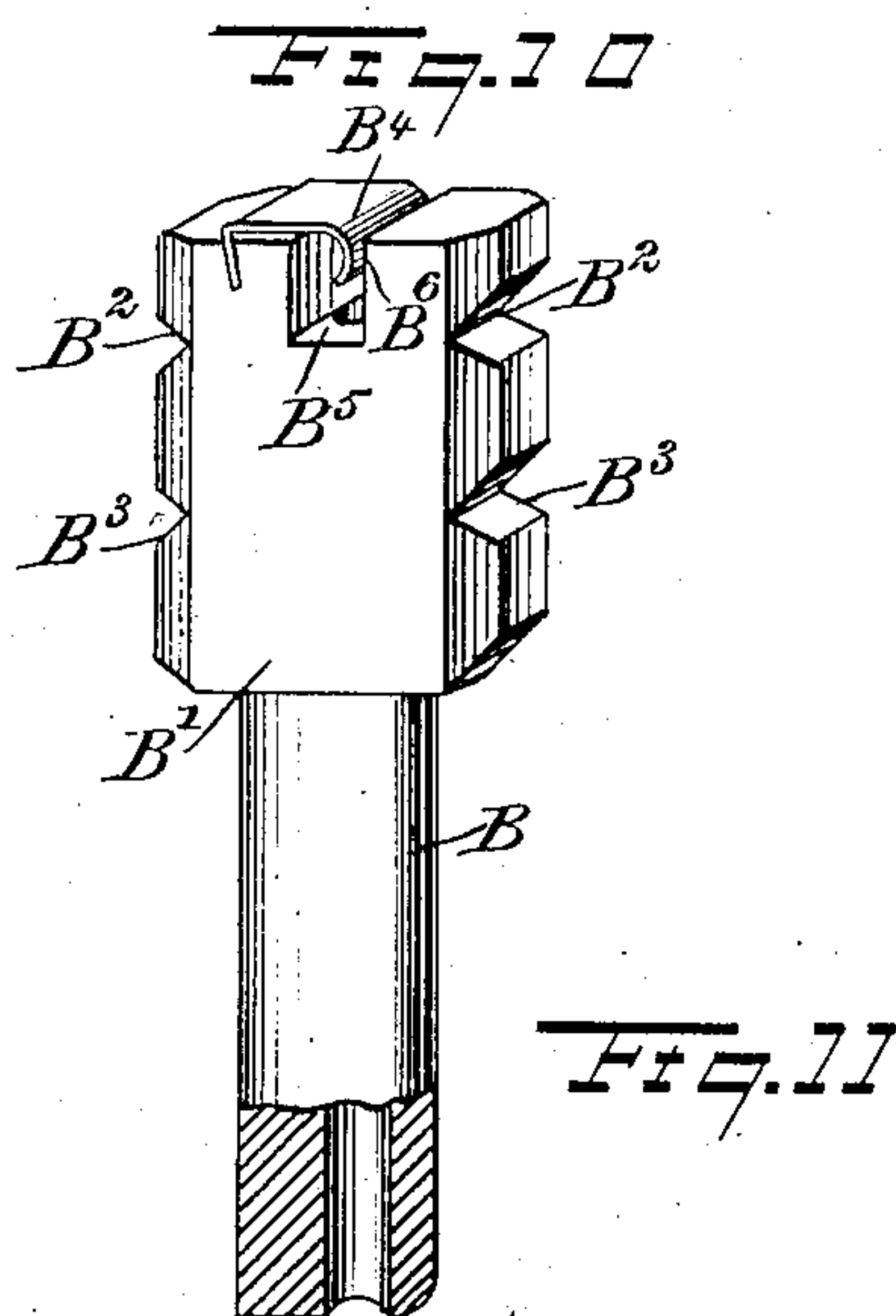
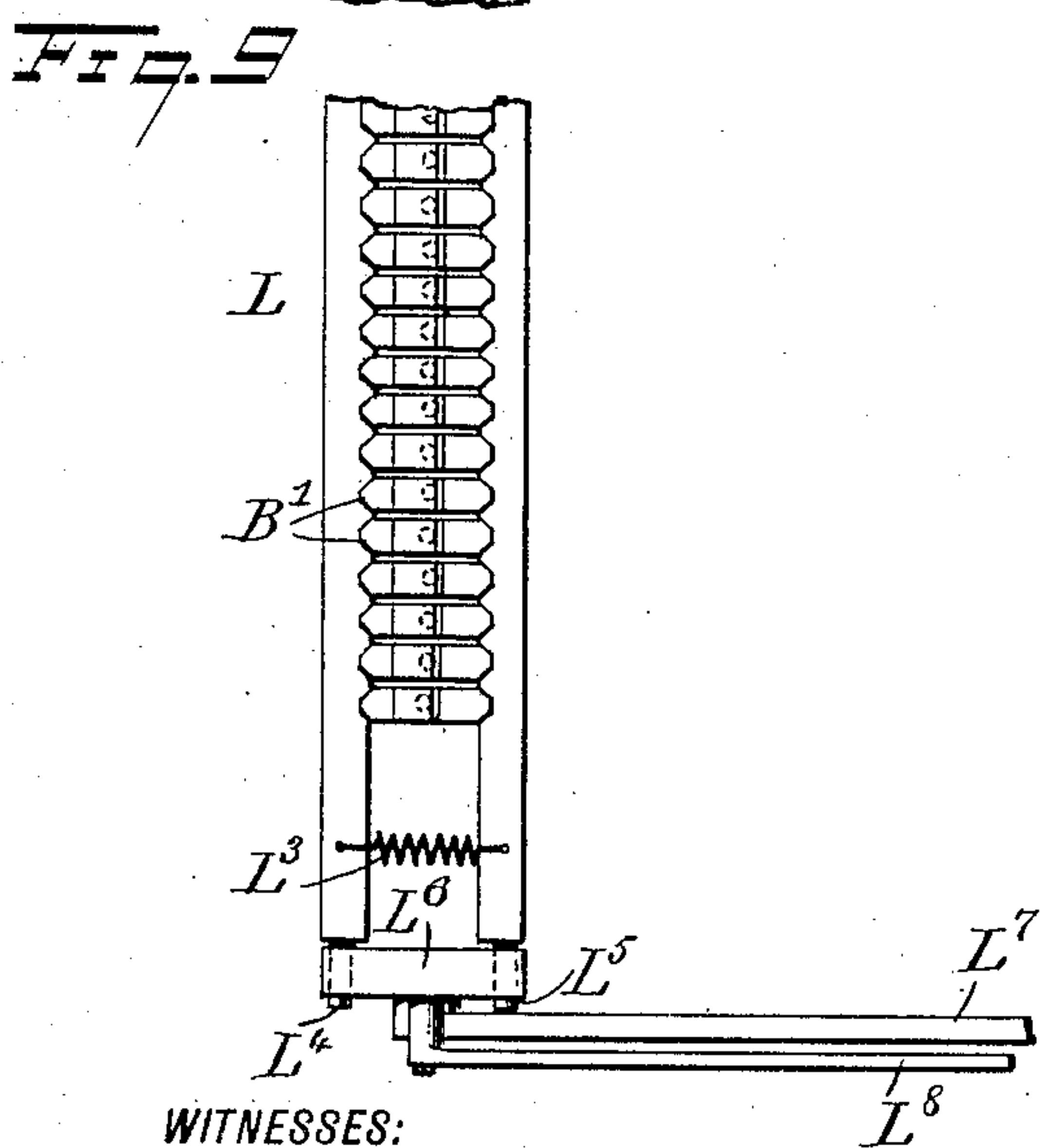
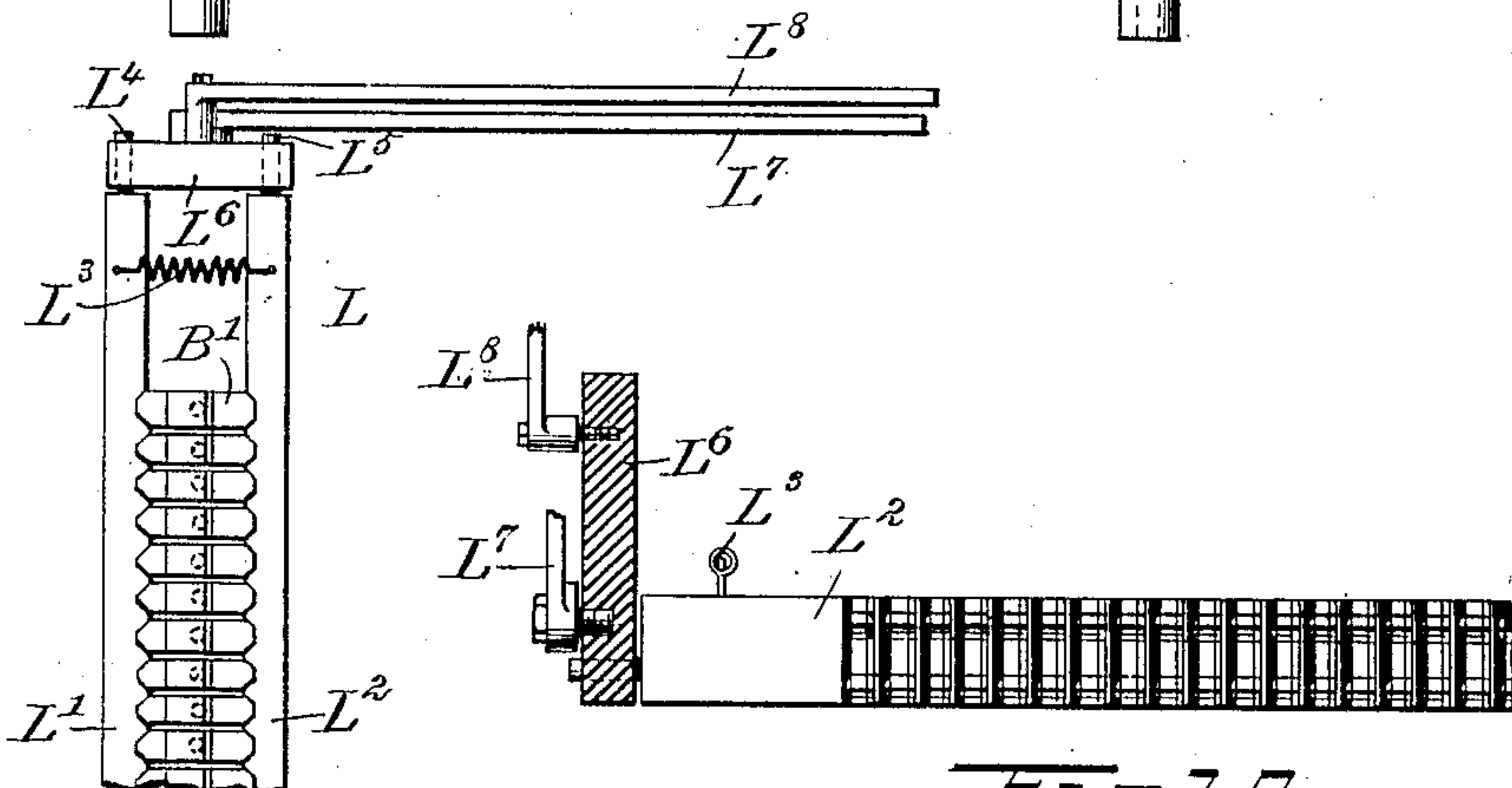
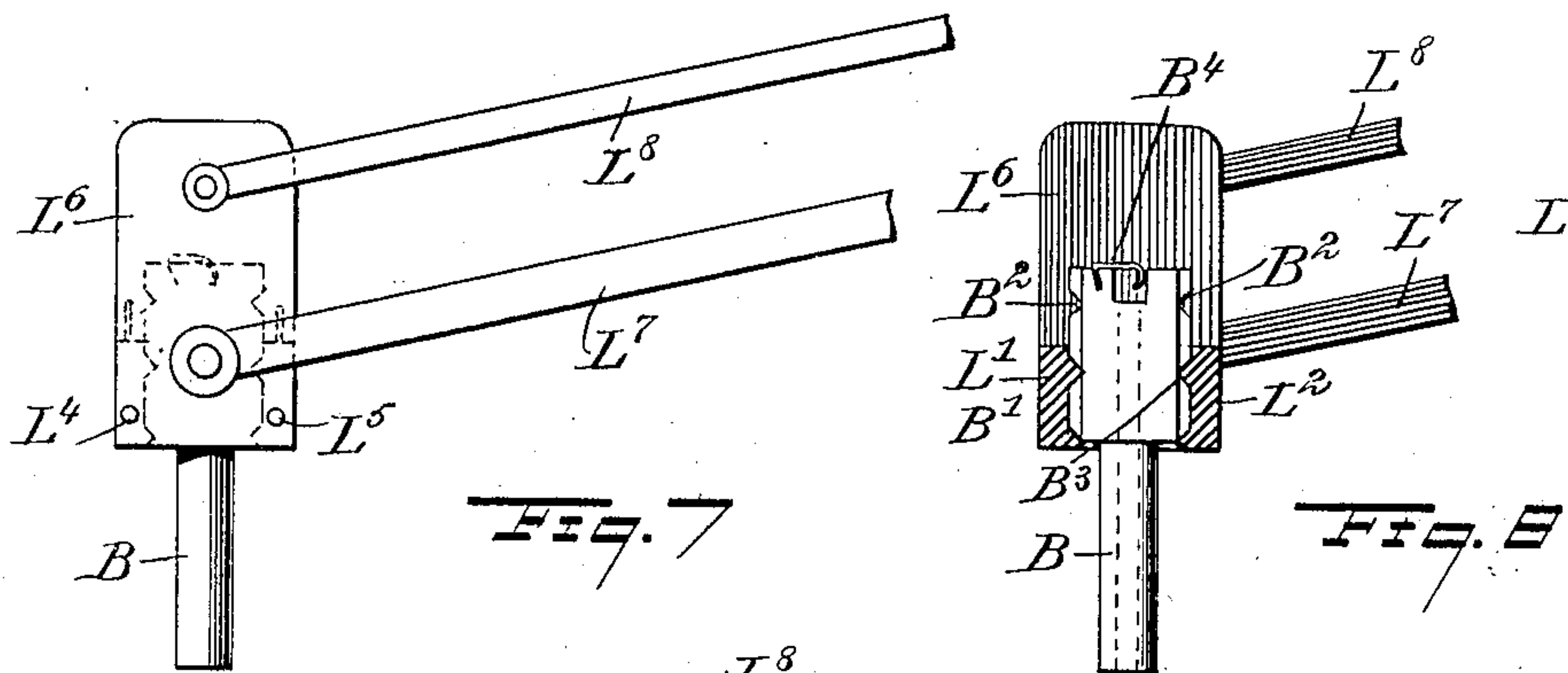
J. K. DALKRANIAN.

PATENTED MAR. 17, 1908.

YARN SELECTING MECHANISM FOR TUFTED FABRIC LOOMS.

APPLICATION FILED APR. 19, 1905.

4 SHEETS—SHEET 4.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JAMES KARMI DALKRANIAN, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED STATES PERSIAN CARPET COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## YARN-SELECTING MECHANISM FOR TUFTED-FABRIC LOOMS.

No. 882,455.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed April 19, 1905. Serial No. 256,386.

*To all whom it may concern:*

Be it known that I, JAMES KARMI DALKRANIAN, a citizen of the United States, and a resident of the city of New York, borough of the Bronx, in the county and State of New York, have invented a new and Improved Yarn-Selecting Mechanism for Tufted-Fabric Looms, of which the following is a full, clear, and exact description.

The invention relates to looms for weaving Axminster and other carpets, oriental rugs and like fabrics, and its object is to provide a new and improved yarn-selecting mechanism arranged to bring any desired colored yarns into position to be used as pile threads for producing a pile face of any desired and predetermined pattern.

The invention consists of novel features and parts and combinations of the same, which will be more fully described herein-after and pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement, parts being in section; Fig. 2 is a front end elevation of the same; Fig. 3 is an enlarged side elevation of the tuft yarn tube carriers, the tuft yarn tubes and the transferring device for carrying a set of tuft yarn tubes to operative position, parts being shown in section; Fig. 4 is a like view of the same showing a set of tuft yarn tubes detached from the tuft yarn tube supports; Fig. 5 is an enlarged sectional side elevation of the improvement; Fig. 6 is a plan view of the tuft yarn tube supports; Fig. 7 is an enlarged side elevation of the transferring device for carrying a set of tuft yarn tubes from the tuft yarn tube supports to operative position and back to the tuft yarn tube supports; Fig. 8 is a sectional side elevation of the same; Fig. 9 is a plan view of the same; Fig. 10 is a cross section of the same; and Fig. 11 is an enlarged perspective view of one of the tuft yarn tubes.

The yarn-selecting mechanism is shown as applied to a loom A for producing oriental fabrics, and the said loom is similar to the one shown and described in Letters Patent No. 858,962 granted to me July 2, 1907, but it is expressly understood that I do not limit

myself to the application of the selecting mechanism for this particular loom, as the selecting mechanism can readily be applied and used on looms of different makes.

In the loom A the ground warp threads *a*, *a'*, to be interwoven with the pile threads *b* and the weft threads, unwind from the usual warp beam (not shown) mounted on the main frame A', and the said ground warp threads *a*, *a'* extend from the warp beam forwardly over a tension-rod A<sup>2</sup>, then through the heddles A<sup>3</sup>, A<sup>4</sup>, and finally to the fabric *d* passing over a breast-beam A<sup>5</sup> arranged on the front end of the main frame A'. The weft threads are passed through the opening of the ground warp threads *a*, *a'* by a suitable shuttle mechanism A<sup>6</sup>, and the pile threads *b* are interlooped with the ground warp threads *a*, *a'* by the use of a looper A<sup>7</sup>, and the said ground warp threads *a*, *a'* are periodically shogged by a shogging device A<sup>8</sup>, and the pile threads and the weft threads are beaten up by a lay A<sup>9</sup>, all as more fully described in the patent above referred to, so that further description of the detailed construction of the loom A is not deemed necessary.

The pile threads *b* extend through tuft yarn tubes B, then over longitudinally-extending guide-rods C mounted on the main frame A', and the said pile threads *b* unwind from bobbins D held on a rack E attached to the main frame A', as plainly illustrated in Fig. 2. A proper tension is given to the pile threads *b* by weights F connected with the pile threads at points between the bobbins D and the guide-rods C, as indicated in Fig. 2.

Each of the tuft yarn tubes B is arranged for the passage of a single pile thread *b* and is provided with a head B' (see Fig. 11), having, on opposite sides, two sets of notches B<sup>2</sup> and B<sup>3</sup>, of which the set of notches B<sup>2</sup> is adapted to be engaged by the V-shaped spring ends of a retainer G secured to the under side of a tuft yarn tube support H arranged in the form of a longitudinally-extending beam mounted to slide in suitable bearings A<sup>10</sup> formed on the main frame A'. The several tuft yarn tube supports H are arranged one alongside the other, as plainly indicated in Fig. 6, and each tuft yarn tube support is adapted to support a plurality of tuft yarn tubes B by a corresponding number



of retainers G, it being understood that each pile thread *b* passing through a tuft yarn tube B also extends through an eye in the corresponding retainer G and the tuft yarn tube support H. (See particularly Figs. 5 and 6). The rear end of each tuft yarn tube support H is pivotally connected by a link H' with the vertical member I' of a bell crank lever I, and the several bell crank levers I are fulcrumed on a transversely-extending rod I<sup>2</sup> attached to the main frame A'. The horizontal member I<sup>3</sup> of each bell crank lever I is connected at different points throughout its length with a set of cords or wires J extending upwardly and connecting with the lower ends of the lifting-hooks K' of a jacquard mechanism K of any approved construction and preferably mounted on the upper end of the main frame A'. The upper hooked ends of the lifting-hooks K' are adapted to hook over the transversely-extending lifting-bars K<sup>2</sup> of the lifting-frame K<sup>3</sup>, adapted to be periodically raised and lowered in the usual manner. The lifting hooks K' are adapted to be moved in and out of engagement with the lifting-bars K<sup>2</sup> by the usual needles K<sup>4</sup> controlled by the card K<sup>5</sup> of the endless pattern chain passing over the usual polygonal cylinder K<sup>6</sup>. A return movement of the bell crank levers and connected parts is had by weights I<sup>4</sup> hung on the horizontal members I<sup>3</sup> of the bell crank levers, as illustrated in the drawings.

By reference to Fig. 1 it will be seen that each set of ropes or wires J is connected with a corresponding set of lifting hooks K', and at every raise of the lifting frame K<sup>3</sup> one of the lifting hooks K' of each set is, by the action of the corresponding needle K<sup>4</sup> and card K<sup>5</sup>, moved in engagement with the corresponding lifting bar K<sup>2</sup>, so that the thus engaged lifting hooks of the several sets are raised and, by the corresponding ropes or wires J, impart a swinging motion to the arms I<sup>3</sup> of the bell crank levers I, to shift the tuft yarn tube supports H corresponding distances from the right to the left. The connections between a set of ropes or wires J with the member I<sup>3</sup> of a bell crank lever I are arranged in geometrical progression, as will be readily understood by reference to Fig. 1, the arrangement being such that the tuft yarn tube support H is shifted either a distance between two adjacent hollow tuft yarn tubes B or a distance between three adjacent tuft yarn tubes, four adjacent tuft yarn tubes or five adjacent tuft yarn tubes, according to which of the lifting rods K' of a set of lifting-hooks is lifted at a time by the frame K<sup>3</sup>. Thus by the arrangement described, all of the tuft yarn tube supports H are shifted simultaneously at each rise of the frame K<sup>3</sup>, but the several tuft yarn tube supports are shifted the same or different distances to bring a number of tuft yarn tubes into transverse

alinement, and the tuft yarn tubes so alined form a set of selected tuft yarn tubes and this set contains but one tuft yarn tube from each support and the set extends at a point for convenient transferring to carry the selected set of tuft yarn tubes and their pile threads down to looping position adjacent to the fabric *d* to permit of interweaving this selected set of pile threads with the ground warp threads *a* and *a'*, as described and shown in the application above referred to.

For the purpose mentioned, a transferring device L is provided for carrying the set of alined tuft yarn tubes B from the tuft yarn tube supports H down to the ground warp threads and back again, and this transferring device L is arranged as follows: Two oppositely-disposed and transversely-extending gripping jaws L' and L<sup>2</sup> are adapted to engage the lowermost set of notches B<sup>3</sup> in the heads B' of the alined tuft yarn tubes B (see Fig. 9), and the said gripping jaws L' and L<sup>2</sup> are pressed toward each other by springs L<sup>3</sup> so as to hold the gripping jaws in firm engagement with the corresponding sets of notches B<sup>3</sup>. The gripping jaws L' and L<sup>2</sup> are fulcrumed at L<sup>4</sup> and L<sup>5</sup> in heads L<sup>6</sup> hung on swing-arms L<sup>7</sup> and L<sup>8</sup>, of which the swing-arms L<sup>7</sup> are fulcrumed at L<sup>9</sup> (see Fig. 1) on the main frame A', and the swing-arms L<sup>7</sup> are connected by links N with levers N' actuated by cams on one of the shafts of the loom A so as to periodically impart the desired swinging motion to the swing-arms L<sup>7</sup>. The swing-arms L<sup>8</sup> are pivotally connected at their rear ends with levers L<sup>10</sup> connected by links N<sup>2</sup> with levers N<sup>3</sup> likewise engaged by cams on one of the shafts of the loom A so that the arms L<sup>8</sup> swing the heads L<sup>6</sup> into the proper position at the time of engaging the jaws L', L<sup>2</sup> with the heads B' on the alined tuft yarn tubes and to hold the tuft yarn tubes carried down to the fabric in the proper position during the formation of the pile-knot, as described in the application above referred to.

In order to engage the gripping jaws L' and L<sup>2</sup> with the heads B' of the alined tuft yarn tubes B, it is necessary to first swing the jaws L' and L<sup>2</sup> into an open position, for conveniently engaging the jaws with opposite sides of the head B', as will be readily understood by reference to Fig. 3. For this purpose the lower wedge-shaped ends of bars O are adapted to pass between the gripping jaws L' and L<sup>2</sup> to swing the same open, and the bars O are mounted to slide up and down in bearings A<sup>11</sup> formed on the main frame A'. The upper ends of the bars O, of which there are preferably two, are connected with each other by a cross-rod O' extending through an elongated slot O<sup>2</sup> in a lever O<sup>3</sup> fulcrumed on the main frame A' and connected by a link O<sup>4</sup> and other mechanism with a suitable cam attached to one of the shafts of the loom A



so that the bars O descend and rise at the proper time to first open the jaws L' and L<sup>2</sup> and then to allow the jaws to close by the action of their springs L<sup>3</sup> for the jaws to engage the lower set of notches B<sup>3</sup> on the heads B' of the alined tuft yarn tubes. When this has been done a downward swinging motion is given to the arms L', L<sup>2</sup>, and in doing so the heads B' of the alined tuft yarn tubes B are pulled out of engagement with the free ends of the retainers G (Fig. 4), and consequently the alined tuft yarn tubes are carried by the transferring device from the supports H down to the fabric to bring the projecting ends of the pile threads of this set of alined tuft yarn tubes within reach of the looper A' for forming the loops on the crossed ground warp threads a, a', as mentioned in the application above referred to.

It is understood that when the alined tuft yarn tubes B are carried downward from the supports H the pile threads b are caused to unwind on their bobbins D as each pile thread b is clamped in its tuft yarn tube B by a suitable clamping device, preferably in the form of a spring B<sup>4</sup> (see Fig. 10) and secured to the top of the head B', the free end of the spring being curved and extended into a notch B<sup>5</sup> formed transversely in the upper end of the head B'. The free curved end of the spring B<sup>4</sup> clamps the pile thread for this tuft yarn tube against the wall B<sup>6</sup> of the notch B<sup>5</sup>, so that when the tuft yarn tube B is carried downward the pile thread is held in position on the tuft yarn tube, and consequently the pile thread is caused to unwind from the corresponding bobbin D. After portions of the pile threads of the alined tuft yarn tubes have been used for forming the knots and the ends of the knots have been cut off, then the transferring device returns the alined tuft yarn tubes back to the supports H and the corresponding retainers G, after which the bars O descend to again open the gripping jaws L' and L<sup>2</sup> to disengage the same from the heads B and to allow the gripping jaws to swing downward a short distance into a dormant position and out of the path of the tuft yarn tubes B, until another shifting of the supports H is made for the next operation.

The operation is as follows: In fixing the loom, the several tuft yarn tubes of a single support H are threaded with yarns of different colors, and when the loom is in operation the supports H are shifted the desired distances to bring such pile threads of the different supports H into transverse alinement as is required for forming a set of piles selected according to a predetermined pattern, the selected tuft yarn tubes and their pile threads being then carried down by the transferring device to the fabric, and the selected pile threads are then engaged by the knot-forming mechanisms of the loom, after which the

ends of the knots formed are cut off by a suitable cutting device P (see Fig. 1), and then the transferring device returns the selected tuft yarn tubes back to the retainers G of the corresponding tuft yarn tube-supports H, after which the transferring device disengages the tuft yarn tubes and moves into a dormant position out of the path of the tuft yarn tubes to allow the jacquard mechanism to again shift the supports H for the next operation. It is understood that during the time the transferring device L takes hold of the alined tuft yarn tubes and carries the same down and back, as described, the lifting-frame K<sup>3</sup> of the jacquard remains in an uppermost position to hold the tuft yarn tube-supports H against movement, and the said lifting-frame K<sup>3</sup> only moves down into a lowermost position after the transferring device L has left the tuft yarn tubes and moved into the dormant position above mentioned. When the lifting-frame K<sup>3</sup> moves downward, the weights I<sup>4</sup> act on the bell crank levers I to return the same, and consequently the supports H, to a normal rearmost position, until the jacquard mechanism again actuates the bell crank levers for the next pick, as above described. Thus, by the arrangement described, any desired combination of the pile threads can be made to produce a pile face in any desired pattern and color and without the use of very cumbersome devices, such as heretofore used in the weaving of Axminster carpets and other fabrics.

It is understood that the several mechanisms described for producing the desired result operate in unison and are driven from the main shaft of the loom, and as the means for actuating the several mechanisms from the main shaft may be of any approved construction, it is not deemed necessary to further illustrate or describe the same.

I do not limit myself to any detailed construction of any one of the several mechanisms employed for producing the desired result, as the same may be varied without deviating from the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A yarn-selecting mechanism provided with a shiftable yarn tube-support, and a plurality of tuft yarn tubes detachably supported on the said adjustable support.

2. A yarn-selecting mechanism provided with a plurality of shiftable tuft yarn tube-supports, each having means for detachably supporting a plurality of tuft yarn tubes.

3. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-supports arranged side by side, and a plurality of tuft yarn tubes on each support.

4. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-supports arranged side by side, and a plural-



ity of tuft yarn tubes detachably held on each support and spaced from each other in the direction of the line of movement of the supports.

5 5. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-supports arranged side by side, a plurality of  
10 tuft yarn tubes detachably held on each support and spaced from each other in the direction of the line of movement of the supports, and means for shifting the said supports independent one of the other.

6. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-  
15 supports arranged side by side; a plurality of tuft yarn tubes detachably held on each support and spaced from each other in the direction of the line of movement of the supports, and means for shifting the said supports  
20 independent one of the other and desired distances to bring any desired set of tuft yarn tubes into transverse alinement.

7. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-  
25 supports arranged side by side, a plurality of tuft yarn tubes detachably held on each support and spaced from each other in the direction of the line of movement of the supports, and alining means for shifting the said tuft  
30 yarn tube supports in the direction of their length to bring any desired combination of tuft yarn tubes into transverse alinement.

8. A yarn-selecting mechanism provided with a plurality of movable supports; a  
35 plurality of tuft yarn tubes detachably held on each support and ranging in the direction of the movement of the said supports, and alining means for each support to shift the same any desired distance to bring a tuft  
40 yarn tube from each support into active position, the several tuft yarn tubes in active position forming a desired combination of tuft yarn tubes according to a predetermined design.

45 9. A yarn-selecting mechanism provided with a plurality of movable supports, a plurality of tuft yarn tubes detachably held on each support and ranging in the direction of the movement of the said supports, graduated shifting-levers, one for each support,  
50 and a jacquard mechanism for actuating the shifting-levers.

10. A yarn-selecting mechanism provided with a plurality of movable supports, a  
55 plurality of tuft yarn tubes detachably held on each support and ranging in the direction of the movement of the said supports, bell crank levers connected with the said supports, and a jacquard mechanism having a  
60 plurality of connections with each bell crank lever.

11. A yarn-selecting mechanism provided with a plurality of movable supports, a  
65 plurality of tuft yarn tubes detachably held on each support and ranging in the direction

of the movement of the said supports, bell crank levers connected with the said supports, and a jacquard mechanism having a plurality of connections with each bell crank lever at points arranged in a geometrical  
70 progression.

12. In a loom, the combination of a jacquard mechanism, of movable supports, each carrying a plurality of detachable yarn carriers, and means connecting the said jac-  
75 quard mechanism with the said supports for shifting the latter according to a geometrical progression.

13. In a loom, the combination of a jacquard mechanism, movable supports, each  
80 carrying a plurality of detachable yarn carriers, and means connected with the said jacquard mechanism and the said supports for shifting the latter according to a geometrical progression, to form a set of detachable se-  
85 lected yarn carriers.

14. In a loom, the combination of a jacquard mechanism, movable supports, each carrying a plurality of detachable yarn carriers, means connected with the said jac-  
90 quard mechanism and the said supports for shifting the latter according to a geometrical progression, to form a set of detachable selected yarn carriers, and a transferring device for bodily transferring the selected yarn  
95 carriers to the cloth-making point.

15. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-supports, a jacquard mechanism for imparting movement to the said supports, a plu-  
100 rality of detachable tuft yarn tubes on each of the said supports, and a transferring device for engaging a set of alined tuft yarn tubes to move the same from the supports to active position and back to the said supports.  
105

16. A yarn-selecting mechanism provided with a plurality of movable tuft yarn tube-supports, a jacquard mechanism for imparting movement to the said supports, a plu-  
110 rality of detachable tuft yarn tubes on each of the said supports, a transferring device for engaging a set of alined tuft yarn tubes to move the same from the supports to active position and back to the said supports, and an opening and closing device for the said  
115 transferring device to connect and disconnect the said transferring device and the said tuft yarn tube.

17. A yarn-selecting mechanism provided with a tuft yarn tube-support having a pair  
120 of spring arms, a tuft yarn tube adapted to be supported in the said arms, a transferring device having a pair of spring-pressed gripping jaws adapted to engage the said tuft yarn tube, and means for opening the said  
125 jaws and releasing the same.

18. A yarn-selecting mechanism provided with a tuft yarn tube-support having a pair of spring arms, a tuft yarn tube adapted to be supported in the said arms, a transferring  
130



device comprising swinging levers, heads carried by the said levers, gripping jaws mounted to turn in the said heads and adapted to engage the said tuft yarn tube and wedges adapted to pass between the said jaws to swing the same into an open position.

19. A yarn-selecting mechanism provided with a tuft yarn tube-support having a pair of spring arms, a tuft yarn tube adapted to be supported in the said arms, a transferring device comprising swinging levers, heads carried by the said levers, gripping jaws mounted to turn in the said heads and adapted to engage the said needle; wedges adapted to pass between the said jaws to swing the same into an open position, and springs connecting the jaws with each other for closing the same on removal of the said wedges.

20. A yarn-selecting mechanism provided with a shank, a head having sets of notches, supporting arms for engaging one set of notches, and gripping jaws for engaging the other set of notches.

21. A yarn-selecting mechanism provided with yarn-carriers, means for selecting from the same to form a set of selected yarn-carriers, and a transferring device for bodily transferring the set of selected yarn-carriers.

22. A loom provided with yarn-selecting mechanism having yarn-carriers, means for selecting from the yarn-carriers to form a set of selected yarn-carriers, and means for bodily transferring the said set of selected yarn-carriers.

23. A loom provided with yarn-carriers, slidable supports for the same, and means for shifting the said supports to form a set of selected yarn-carriers.

24. A loom provided with yarn-carriers, slidable supports for the same, means for shifting the said supports to form a set of selected yarn-carriers, and means for bodily removing the said set of selected yarn-carriers from the said supports.

25. A loom provided with yarn-carriers, supports for the same, means for shifting the said supports to form a set of selected yarn-carriers, means for bodily removing the said set of selected yarn-carriers from the said supports and returning the said yarn-carriers to the supports, and means for holding the supports in the selected position during the removal and return of the said set of selected yarn-carriers.

26. A loom provided with yarn-carriers, means for selecting a number of the said yarn-carriers to form a set of selected yarn-carriers, and means for bodily removing the set of selected yarn-carriers.

27. A loom provided with yarn-carriers, shiftable supports having retainers for detachably supporting the said yarn-carriers, and selecting means for shifting the said supports to form a set of selected yarn-carriers.

28. A loom provided with yarn-carriers, shiftable supports having retainers for detachably supporting the said yarn-carriers, selecting means for shifting the said supports to form a set of selected yarn-carriers, and means for bodily removing the said set of selected yarn-carriers from their retainers.

29. A loom provided with yarn-carriers, shiftable supports having retainers for detachably supporting the said yarn-carriers, selecting means for shifting the said supports to form a set of selected yarn-carriers, engaging means for engaging the said set of selected yarn-carriers, and mechanism for the said engaging means to move the latter to and from the said supports.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES KARMI DALKRANIAN.

Witnesses:

THEO. G. HOSTER,  
EVERARD BOLTON MARSHALL.