

(No Model.)

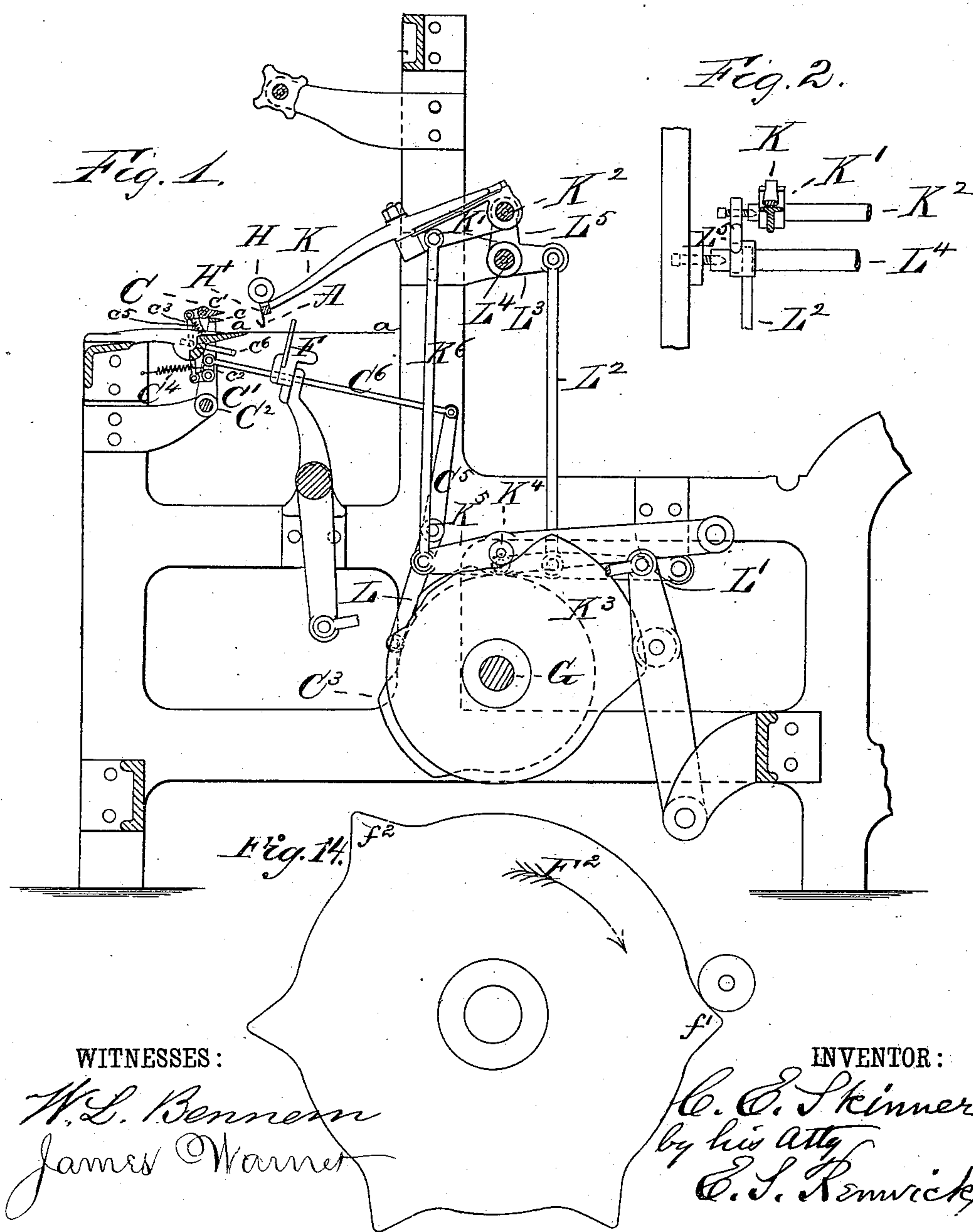
2 Sheets—Sheet 1.

C. E. SKINNER.

LOOM FOR WEAVING TUFTED FABRICS.

No. 310,089.

Patented Dec. 30, 1884.



WITNESSES:

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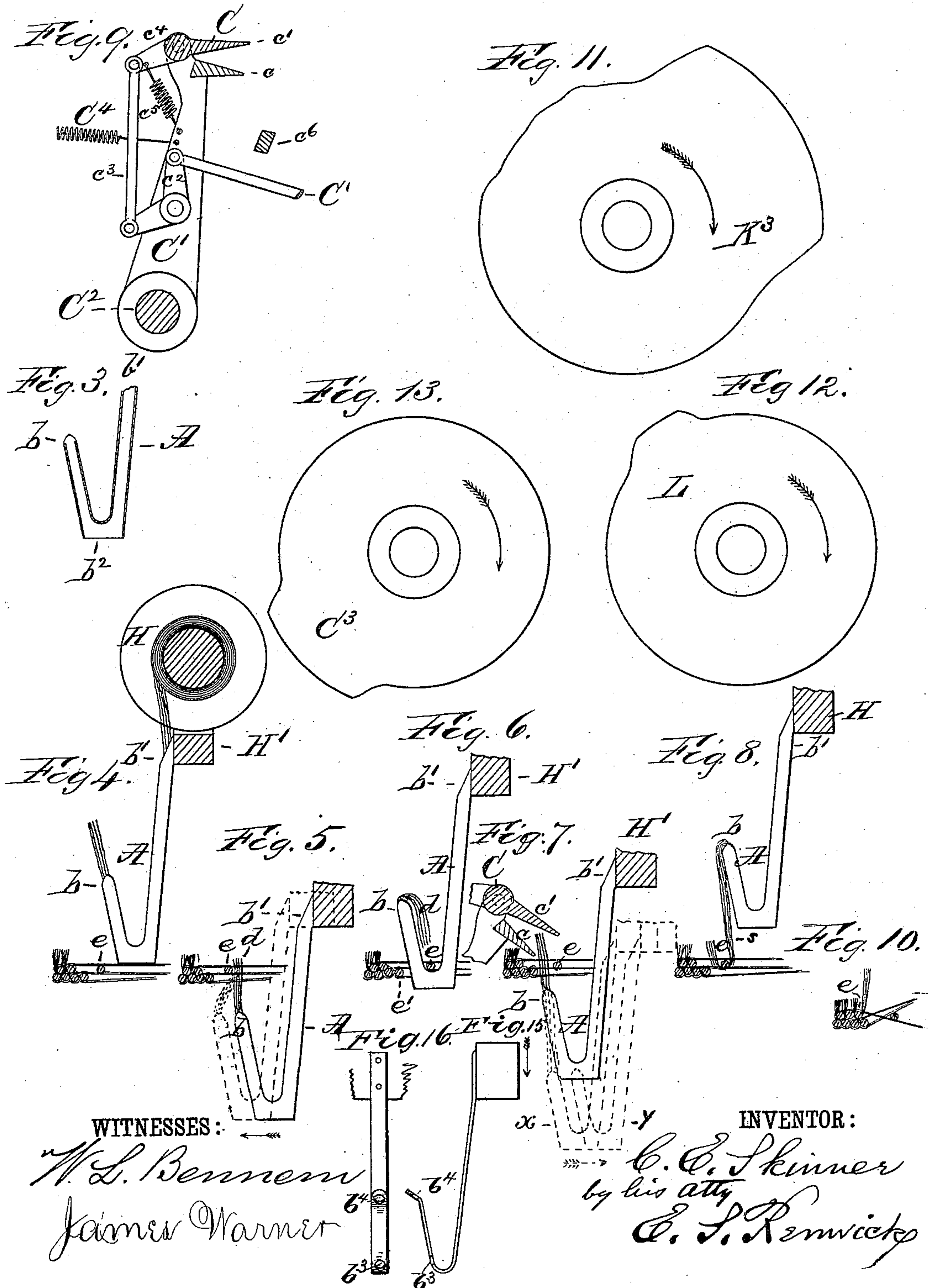
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UNITED STATES PATENT OFFICE.

CHARLES E. SKINNER, OF YONKERS, NEW YORK, ASSIGNOR TO THE SMITH
MOQUETTE LOOM COMPANY, OF SAME PLACE.

LOOM FOR WEAVING TUFTED FABRICS.

SPECIFICATION forming part of Letters Patent No. 310,089, dated December 30, 1884.

Application filed September 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD SKINNER, of Yonkers, in the county of Westchester and State of New York, have made an invention of certain new and useful Improvements in Looms for Weaving Tufted Fabrics; and I do hereby declare that the following, in connection with the accompanying drawings, is a full, clear, and exact description and specification of the same.

This invention has reference to looms for weaving Moquette carpets and similar fabrics, in the weaving of which transverse rows of tufts of colored yarns are inserted in and secured to the body of the fabric; and the object of the invention is to enable the ends of the tufting yarns or material to be introduced into the said body from the back or under side thereof by mechanism operating at the front or upper side thereof.

To this effect my invention consists of certain constructions and combinations of devices, which are set forth in the claims at the close of this specification.

In order that these combinations may be understood, I have represented in the accompanying drawings certain parts of the loom in which I have embodied the invention, and I will proceed to describe the same, it being understood that the loom is in other respects constructed substantially like looms heretofore known for weaving Moquette carpets.

Figure 1 of the said drawings represents a transverse section of the said parts of the loom. Fig. 2 represents a front view of portions thereof. Figs. 3 to 16, both inclusive, represent views of parts of the mechanism and of the yarns upon a larger scale than the preceding figures.

As the invention has reference to particular portions only of a loom, the other parts thereof are omitted from the drawings for perspicuity. They may be constructed in any desirable manner—as, for example, substantially as described and represented in Letters Patent of the United States No. 186,374, with such variations as may be necessary by reason of the embodiment in the loom of the mechanism hereinafter described.

The warp and the weft threads (or filling) of

the fabric may be held and operated by substantially the same means as are used in other Moquette looms.

The tufting material by preference consists of colored yarns, which are applied to a series of spools or other yarn-holders, which are carried by means of chains or other mechanisms, and are presented in succession to the devices by which they are brought to and removed from the vicinity of the fabric for the purpose of having the tufts placed therein, a separate spool being provided for each row of tufts to be inserted in producing the figure or design to be woven. Each spool H is by preference fitted in a spool-frame, H', which may be moved toward and from the position in the loom at which the tufting is to be applied to the warp-threads by means of a pair of movable arms, K—one at each side of the loom—which are connected with a rock-shaft, K², that is caused to rock, so as to move the ends of the movable arms toward and from the position of the warps in the loom, the line of the warps being indicated by the line *a a* in Fig. 1. The movable arms K are preferably provided at their ends with clutches to grasp the ends of the spool-frames, and the said arms are preferably connected by pivots with the rock-shaft arms K', (there being one arm K' for each movable arm K,) so that the ends of the first may be moved laterally in opposite directions to grasp and release each spool-frame in succession. The movements of the ends of the said movable arms toward and from the position of the warp-threads or fabric being woven are controlled by a cam, K³, operating upon said arms through the intervention of a friction-wheel, K⁴, cam-lever K⁵, rod K⁶, rock-shaft arms K', and the rock-shaft K², the weight of the arms and their connections causing their front ends to descend whenever the cam permits this movement, and the cam raising them as required. The lateral movements of the movable arms to enable them to grasp and release the spool-frames may be effected by the same means as are described for that purpose in the United States Patent No. 233,290.

In order that the present invention may be embodied in a loom, the loom is provided with a series of tubes, A, having a return-bend, so

that the orifice *b* of the tube points approximately in the same direction as the receiving end *b'*, or it is provided with the substantial equivalents of such tubes. These devices will hereinafter be called, for distinction, "V-tubes" or "V-formed tubes." The number of tubes in the series corresponds with the number of distinct tufts of material to be inserted at any place in the breadth of the fabric being woven, and they are moved in between and out of the warp-threads and forward and backward in the loom. In the present example of my invention the V-tubes are moved through the intervention of the spool-frames, and for this purpose a separate series of V-tubes is provided for each spool-frame, and the members of each series are secured to the bar *H'* of said spool-frame, so as to project downward therefrom as the spool-frame is carried toward the position of the warp-threads in the loom. The yarns from the spool are passed through the tubes, downward through the rear branch of the V, and upward through the forward branch thereof, and the yarn ends protrude in an upward direction at the upper ends, *b*, of the said forward branches.

In order that the tufts may be inserted between the warps, the shoot of filling around which the tufts are to be bent is inserted in the shed of warp-threads, and is partially beaten up, as represented at *e*, Fig. 4. The series of V-tubes are then caused to descend, first toward the warp-threads, as represented at Fig. 4, and then downward between the warp-threads, as represented in continuous lines in Fig. 5. When their forward ends are below the filling, the tubes are moved forward in the loom, as represented in dotted lines in Fig. 5, and are partially raised, as represented in continuous lines in Fig. 6, so as to insert the ends *d* of the tufting-yarns between the fell *e'* of the fabric and the partially-beaten-up shoot of filling *e*, the insertion through the warp being from beneath upward, although the V-tubes and the tufting material are normally above the position of the warps in the loom. After the ends of the tufting material are passed through the warp, the V-tubes are moved downward a short distance, as represented in continuous lines in Fig. 7, and the resistance of the threads of the fabric to the withdrawal of the tufting causes its ends to stand substantially erect or projected upward. While the ends of the tufting material are projected upward, as at Fig. 7, a pair of nipper-jaws, *C*, Figs. 1, 7, and 9, are caused to seize them. After such seizure the series of tubes are depressed sufficiently to draw from the spool the material required to form the next row of tufts from that spool, substantially as represented in dotted lines at *x*, Fig. 7, are moved backward in the loom, as represented in dotted lines at *y*, Fig. 7, (so as to be clear of the shoot *e* of tufting-filling,) and are raised, as represented at Fig. 8, the result of the aforesaid operations being the

formation of a row of loops of tufting material upon the shoot *e* of tufting-filling. The ends of the tufts are then released by the opening of the nipper-jaws *C*, the shoot of tufting-filling is completely driven up by the action of the lay of the loom in the usual manner, and the series of loops of tufting material are cut loose at *s* from the yarns in the V-tubes by cutting devices of the usual construction employed in Moquette looms, the spool-frame and tubes being afterward raised by the action of the arms *K*, and re-engaged with the means of carrying them, and the next succeeding spool-frame, with its spool of tufting material and V-tubes, being moved into the position to be taken in turn by the transferring-arms.

These several descending and ascending movements of the V-tubes above described are controlled through the transferring-arms *K* (which hold the spool-frames and tubes) by means of the cam *K³*, which is secured to and caused to revolve with the cam-shaft *G* of the loom, the descending movements being effected by the weight of the parts as controlled by the grades of the cam, and the ascending movements being effected by corresponding grades of the cam. The forward and backward movements of the V-tubes are determined by a second cam, *L*, which operates upon the spool-frame and tubes through the intervention of a friction-wheel, cam-lever *L'*, connecting-rod *L²*, rock-shaft arm *L³*, counter rock-shaft *L⁴*, and a pair of rock-shaft arms, *L⁵*—one at each end of the rock-shaft *L⁴*—which form the bearings for the rock-shaft *K²* of the transferring-arms *K*, so that the forward and backward movements are communicated to the tubes through the transferring-arms. The nipping-jaws *C*, for seizing the ends of the tufting-yarns, extend across the warp in the loom. One of said jaws is secured to and carried by a pair of arms, *C'*—one at each side of the loom—which are secured to a rock-shaft, *C²*. The other jaw, *c'*, is pivoted to ears of the said nipper-arms *C'*, so that its outer edge can be rocked toward and from the fixed jaw *c*. The nipper rock-shaft *C²* is supported in bearings made fast to the loom-frame, and it is rocked at proper times to place the jaws in the proper position to seize the tuft ends and to withdraw the jaws in a forward direction in the loom, out of the way of other mechanism, by means of a cam, *C³*, secured to the cam-shaft of the loom, and a spring, *C⁴*, acting antagonistically to said cam. The same cam also is employed, by preference, to determine the opening and closing of the jaws. For this purpose the cam is combined with the nipper-jaws through the intervention of a friction-wheel and the cam-lever *C⁵*, the connecting-rod *C⁶*, the bell-crank *c²*, (which is pivoted to one of the nipper-arms *C'*), the link *c³*, and a lever-arm, *c⁴*, projecting from the movable nipper-jaw *c'*. A second spring, *c⁵*, also is provided to tend to open the movable nipper-jaw, and to effect its opening whenever

that operation is permitted. This spring c^5 is made stronger than the spring C^4 , which moves the jaws antagonistically to the cam C^3 , and a stop, c^6 , is provided to limit the movement of the arms by the action of the cam; hence until the progressive movement of the two nipper-jaws by the cam is stopped by the stop c^6 the stronger spring c^5 does not yield, and the nipper-jaws remain open. When, however, the progressive movement of the jaws backward in the loom is stopped by the stop c^6 , the continued operation of the cam C^3 , operating through the link c^3 , extends the spring c^5 and closes the nipper-jaws. The continued revolution of the cam C^3 permits the connecting-rod C^6 to retrograde, and as the jaw-spring c^5 is stronger than the spring C^4 , the former takes up the movement of the connecting-rod until the jaws are opened, after which the spring C^4 operates to move them bodily toward the breast-beam of the loom, as the cam in its revolution permits the connecting-rod C^6 to retrograde to its normal position.

The V-tubes may be replaced by their equivalents, such as needles having their stems bent to substantially a V form; but when tubes are used I prefer to construct them with an opening at the bend or elbow b^2 , Fig. 3, so that a wire hook may be readily applied to draw the yarns through the tubes; and when needles are used I prefer to construct them, as represented at Figs. 15 and 16, with an eye, b^3 , at or near the bend, and a second eye, b^4 , at or near the point of the needle, for the passage of the yarn.

The lay F of the loom should be operated by a cam such as represented at F^2 , Fig. 14, having two grades adapted to drive up the tufting-filling e at two operations, the first grade, f' , driving the shoot of filling up to

the position shown at Figs. 4, 5, 6, 7, and 8, and the second grade, f^2 , moving the lay to the fell of the fabric, so as to drive the tufting-filling up to its place in the fabric, as at e , Fig. 10. The other projections or grades of the lay-cam F^2 operate the lay in proper order to drive up the filling for the body of the fabric.

The mechanism for operating the said tubes and nipper-jaws may be varied as circumstances and the views of different users of my invention render expedient.

Parts of my invention also may be used without other parts thereof.

I claim as my invention—

1. The combination, substantially as before set forth, of the series of V-formed tubes with mechanism, substantially as before set forth, whereby said tubes are moved toward the position of the warp-threads in a loom from one side of said position, and are caused to introduce the ends of tufting material between said warp-threads from the opposite side of said position.

2. The combination, substantially as before set forth, of V-formed tubes and the spool-frame.

3. The combination, substantially as before set forth, of the series of V-formed tubes and the nipping-jaws.

4. The bent tufting-tube constructed, substantially as before set forth, with a return-bend and an opening at the angle of said bend.

In witness whereof I have hereto set my hand this 16th day of September, A. D. 1882.

CHARLES EDWARD SKINNER.

Witnesses:

EDWARD A. CLARK,
JOHN V. LING.