

(No Model.)

4 Sheets—Sheet 1.

G. BORLAND & A. K. SHERWOOD.
LOOM.

No. 572,926.

Patented Dec. 8, 1896.

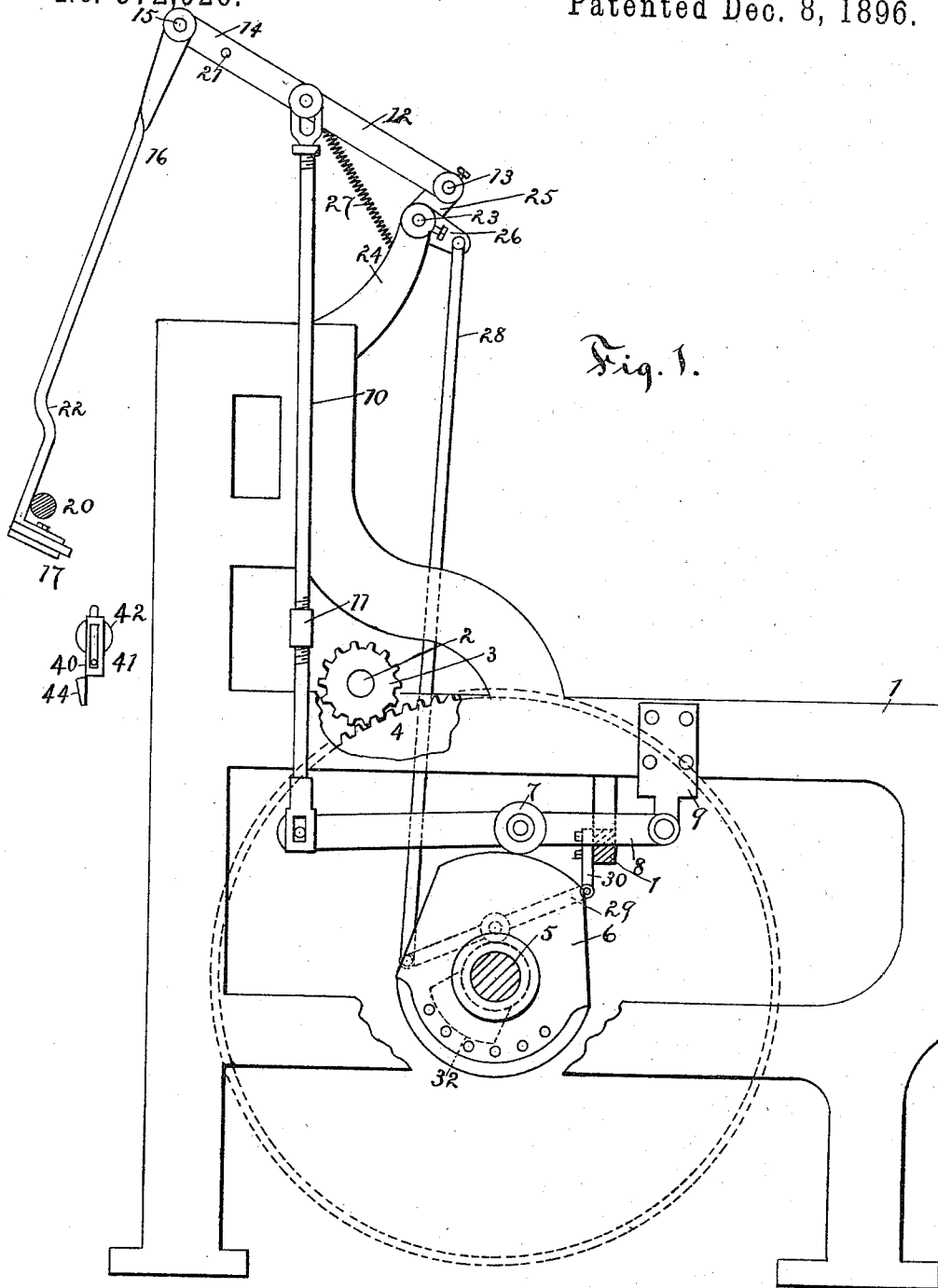


Fig. 1.

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4 Sheets—Sheet 2.

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Fig. 2

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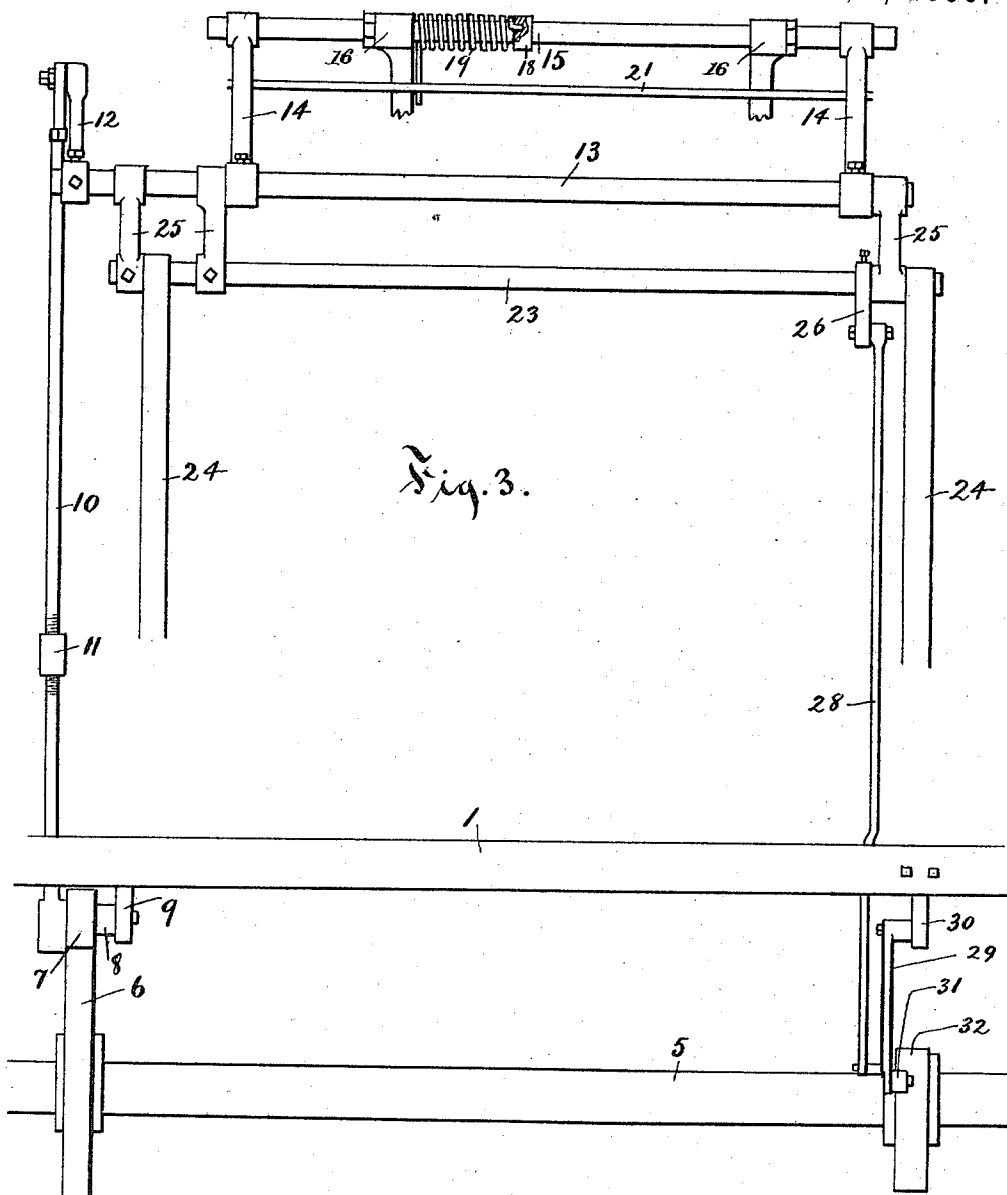
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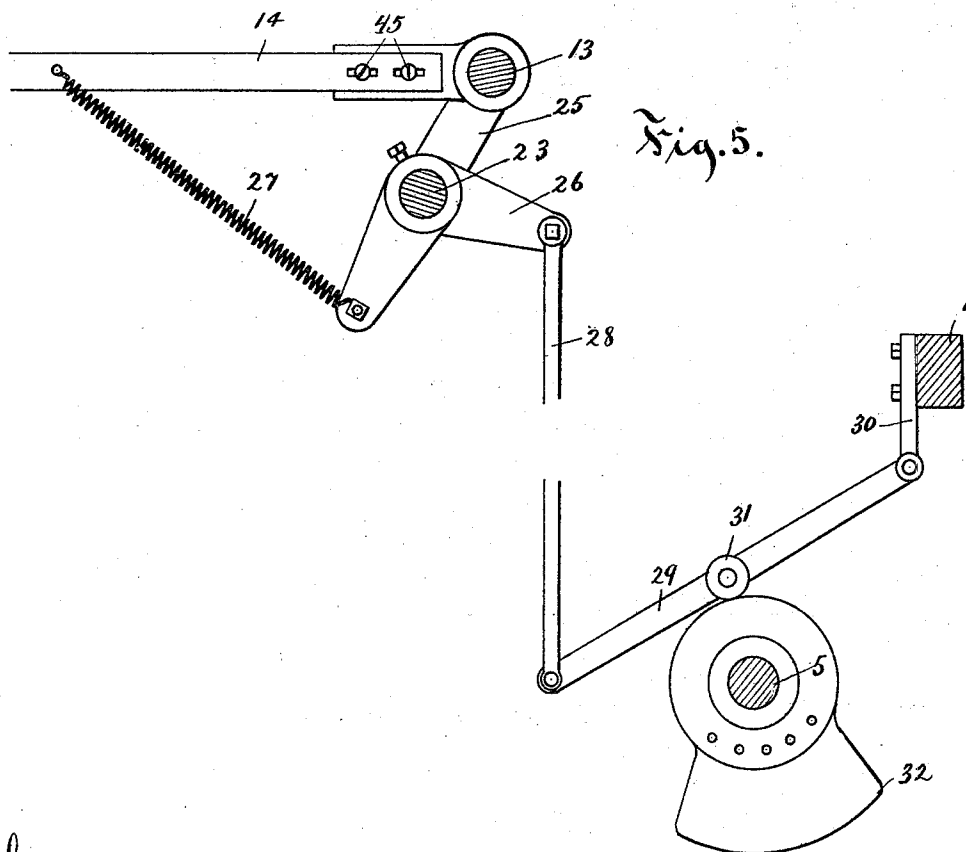
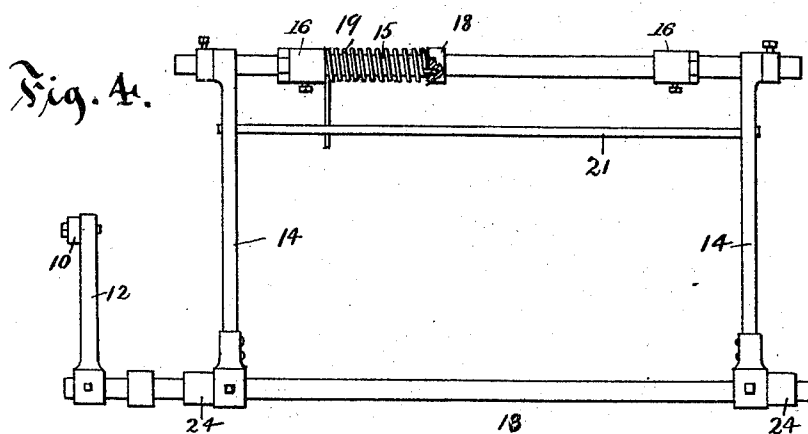
4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

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LOOM.

SPECIFICATION forming part of Letters Patent No. 572,926, dated December 8, 1896.

Application filed February 18, 1895. Serial No. 538,893. (No model.)

To all whom it may concern:

Be it known that we, GEORGE BORLAND and ARTHUR K. SHERWOOD, citizens of the United States, residing at Thompsonville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Looms, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

Our invention relates to the class of looms for weaving tufted fabrics in which the tuft-yarns are wound side by side upon tuft-yarn beams supported in a carriage that also supports a series of quills or yarn-carriers, one for each yarn, the whole being carried by an endless chain. The yarns have their free ends projected through the quills, and when the carriage is taken from the endless chain the quills, with the yarns carried thereby, are inserted into the shed between the practically parallel warp-threads, the free ends of each tuft-yarn projecting outside of the warp-threads, a weft being then passed through the shed, crossing the tuft-yarns in the shed between their free ends and the quills or carriers.

The object of our invention is to provide in a machine of this class means for certainly controlling the insertion of the tuft-yarns into the shed, so that the free end of each yarn will be drawn down even with the plane of the finished fabric and not leave the end projecting to be cut off and wasted by the subsequent operation of the trimming-knife in order to make each of the tufts of a uniform length in the finished fabric.

To this end our invention consists in the combination of the several parts making up the improvement as a whole and in the details of the several parts, as more particularly hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a detail end view of a portion of the frame of a loom, showing our improvement and with the tension or clamp device at the upper limit of its play. Fig. 2 is a detail front view of the clamp-shaft and connected parts. Fig. 3 is a detail rear view of the device with the

clamp-arms broken off. Fig. 4 is a detail top or plan view showing the lifting-shaft and clamp-frame. Fig. 5 is a detail side view, in vertical section, of the device, showing the mechanism for rocking the clamp into engagement with the tuft-yarn-beam carriage. Fig. 6 is a diagram view in side elevation, showing the improvement with the clamp or tension device at the lower limit of its play and in engagement with the tuft-yarn-beam carriage.

In the drawings herein there is shown a portion of the frame of a loom and so much only of the mechanism as is necessary to a clear understanding of the invention. A form of loom in which the invention may be successfully practiced is shown in United States Patent No. 490,237, although it should be understood that the invention is not necessarily limited to use in connection with the particular machine shown in said patent, reference being made to the patent for a clear understanding of the present invention only.

In producing a fabric in a loom of this class in the prior art the tuft-yarns are inserted into the shed between the warp-threads, and a weft is then passed through the shed around which the tuft-yarns are subsequently drawn, the tuft-yarns having been previously unwound from a tuft-yarn beam to an extent sufficient to allow them to be drawn down around the weft with their free ends even with the outside surface of the finished fabric and while the tuft-yarn beam is held against rotation. Should, however, the tuft-yarns on the beam become loose or slack between the quills and the beam by the accidental rotation of the latter, instead of drawing the free ends of the tuft-yarns down even with the surface of the finished fabric the loose or slack yarn between the beam and the quills will be drawn down, this leaving the free ends projecting too far above the surface of the finished fabric. Such extra length is cut off in the subsequent operation of the trimming-knife and is a waste of the material. When the tuft-yarns have become nearly unwound and free from the tuft-yarn beam, a considerable por-

tion of the length still projects above the quills, and in this operation of inserting the tuft-yarn into the shed instead of the free ends being drawn down around the weft the yarn is drawn from the opposite side of the quill in each operation, the free ends of the yarn being trimmed off, as above described, this causing the material to be wasted at each operation after the yarns have become free from the beam.

In the within-described invention we have provided mechanism whereby this waste of material is almost if not wholly prevented.

In the accompanying drawings the numeral 1 denotes the frame of the machine; 2, the main shaft, to which is secured a gear 3 in mesh with a gear 4, secured to the main cam-shaft 5, supported in bearings on the frame of the machine.

A cam 6 is secured to the cam-shaft 5 and is in engagement with a roller 7, pivoted on a lifting-lever 8. This lever 8 is pivoted to a bracket 9, secured to the frame, and to the opposite end of the lever is pivoted a lifting-rod 10, the roller 7 being secured to the lever between the bracket 9 and the rod 10.

The rod 10 is preferably made in two parts, an adjusting-nut 11 connecting the sections by means of interengaging screw-threaded parts and serving as a means for lengthening or shortening it. The upper end of the lifting-rod 10 is pivoted to a lifting-lever 12, and the opposite end of the lifting-lever is secured to a lifting-shaft 13.

The side parts 14 of a clamp-frame are secured at their inner ends to the lifting-shaft 13, and a clamp-shaft 15 is pivoted in the side parts 14 of the frame. Clamp-arms 16 are secured to the clamp-shaft 15, the lower ends of the arms having secured thereto a clamp 17. This clamp is preferably formed of a yielding material, as rubber, in the form shown a strip of rubber being secured between a plate secured to intumed projections on the lower ends of the arms and a removable plate 46, secured to said arms. A collar 18 is adjustably secured to the clamp-shaft 15 and a spiral spring 19, having one end in engagement with the collar 18 and its opposite end extended and in engagement with the holding-rod 21, which is secured between the side parts 14 of the frame. The tension of the spring 19 causes the arms 16 to be always held in engagement with a sprocket-wheel shaft 20, said shaft preventing any inward movement of that part of the arm in engagement with the shaft, the guides or cams hereinafter described causing the clamp to be projected downward to its proper position.

A clamp cam or guide 22 is formed on the inside of the clamp-arm 16 for the purpose of guiding said arms in their downward movement to avoid parts of the mechanism which would be in the line of movement of the clamp 17 should it be projected in a straight path. The sprocket-wheel shaft 20 serves the

purpose of a guide pin or rod to determine the extent of inward swinging movement of the bottom part of the clamp-arms.

It is to be noted that the collar 18 is adjustably secured on the clamp-shaft 15 for the purpose of varying the tension of the spring 19.

The side parts 14 of the clamp-frame are made in two sections, as shown, (see Fig. 5,) the inner section of each of the arms being secured to the lifting-shaft 13 and the outer section of each of the side parts of the frame being adjustably secured to the inner section, as by means of the screws 45, projecting through slotted openings in the side parts 14 of the frame.

A rock-shaft 23 is mounted in the frame 1, (in the form shown to upward-projecting parts 24 from the side parts of the frame,) and to this rock-shaft are secured brackets 25, in the outer ends of which is mounted the lifting-shaft 13. A bent lever 26 is secured to the rock-shaft 23, and one end of a clamp-spring 27 is secured to this bent lever, the opposite end of the spring being properly secured to place the spring under tension in certain positions of the bent lever 26. The spring is shown herein as secured to a side part 14 of the clamp-frame. To the opposite arm of the bent lever 26 is pivotally secured one end of the clamp-rod 28, and the opposite end of the rod is pivoted to a clamp-lever 29. The opposite end of the clamp-lever 29 is pivoted to a bracket 30, secured to the frame 1. A roller 31 is pivoted to the clamp-lever 29 between the bracket 30 and the clamp-rod 28, and this roller is in engagement with a cam 32, secured to the main cam-shaft 5 of the machine.

The operation of the device in connection with other parts of the machine is as follows: The carriage 41, bearing the tuft-yarn beam 42 and yarns wound thereon, is taken from the endless chain 33, borne on sprocket-wheels 43, by any well-known form of mechanism common to this class of looms and carried toward the shed, the quills 44, supported by cross-bar 40 and bearing the tuft-yarns, being inserted between the warp-threads with the free end of the tuft yarn projecting above the outer surface of the warp, in this operation the clamp being at the upper limit of its play, as shown in Fig. 1 of the drawings. After the tuft-yarn beam 42 has been carried to this position the clamp 17 is carried downward by the operation of the cam 6 to a position opposite the tuft-yarn beam, the cam being so timed with regard to the other mechanisms that this movement shall take place at the proper time. A weft-carrier having a suitable weft is passed through the shed between the warp-threads, and the upper ends of the clamp-arms 16 are swung forward, bringing the clamp 17 into engagement with the tuft-yarns borne on the carriage between the tuft-yarn beam and the quills and clamps them against any lengthwise movement, this

swinging movement of the arms 16 being caused by the operation of the rock-shaft 23 through the impulse of the clamp-rod 28 and the cam 32, this cam being properly timed with reference to the other moving parts of the mechanism. The tuft-yarn beam is now raised a short distance, the clamp 17 being also raised a like distance under the impulse of the cam 6, this raising of the tuft-yarn beam causing the ends of the tuft-yarns to be drawn around the weft a distance just sufficient to bring the ends down even with the finished fabric, the clamp holding the yarns securely and compelling the ends to be thus drawn down and preventing any pull upon the yarns from an opposite direction. The clamp is then released from its hold upon the tuft-yarns by an inward swinging movement of the upper ends of the clamp-arms 16 under the impulse of the cam 32, and the tuft-yarn beam is again raised by its operating mechanism to draw out the yarns to provide a sufficient length for the next tuft to be inserted into the fabric. A knife is then swung across the upper surface of the fabric, severing the tuft-yarns, this knife being operated by any well-known form of mechanism common to this class of looms. The clamp is then moved to the upper limit of its play by the operation of the cam 6 and connected mechanism in engagement therewith, when the operation is again repeated. The spring 19 holds the arms 16 normally in engagement with the sprocket-wheel shaft 20, and the cam 22 on each of the arms is so formed as to properly guide the clamp 17 to avoid any of the operating parts of the machine.

It is obvious that different forms of clamp may be used to accomplish the same purpose, and we do not desire to limit ourselves to the precise form of clamp herein shown and described, our invention covering any form of device in which a clamp is presented to the tuft-yarns between their free ends and the tuft-yarn beam to hold said yarns and compel the ends to be drawn down even with the finished fabric and preventing any pull upon the yarn in an opposite direction to take up any slack occurring between the ends of the yarns and the tuft-yarn beam, and thus preventing the free end from being drawn down level with the surface of the finished fabric.

A guide is referred to in the specification and claims herein, this guide consisting of a certain form given to the clamp-arms that cooperate with a fixed support to properly conduct the clamp to its position, this formation of the bends on the clamp-arms being called a "cam;" but it is obvious that any form of guide consisting of a fixed part cooperating with a cam-surface in connection with the clamp-arms for projecting them to their proper position will come within the scope of the invention.

There is shown and described herein a clamp supported by a clamp-arm secured to each

end thereof; but it is obvious that any means for supporting a clamp to cause said clamp to act directly upon the tuft-yarns will come within the scope of our invention.

We claim as our invention—

1. In a loom for weaving tufted fabrics, a movable yarn-holder upon which the tuft-yarns are wound, and a tuft-yarn clamp acting directly upon said tuft-yarns, all substantially as described.

2. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp to engage said yarns between their free ends and the tuft-yarn beam, all substantially as described.

3. In combination in a loom, a carriage bearing a tuft-yarn beam and quills or guides, and a clamp to engage the tuft-yarns borne on the beam, between said beam and the quills, all substantially as described.

4. In a loom for weaving tufted fabrics, a movable yarn-holder upon which the tuft-yarns are wound, a series of tuft-yarn tubes connected thereto and movable therewith, and a tuft-yarn clamp acting directly upon the said tuft-yarns, all substantially as described.

5. In combination, a carriage bearing a tuft-yarn beam and quills or guides, and a yielding clamp to engage the yarns borne on the beam between it and the quills, all substantially as described.

6. In combination, a carriage bearing a tuft-yarn beam and quills or guides, a clamp extending lengthwise of the tuft-yarn beam to engage the tuft-yarns borne on the beam between it and the quills, all substantially as described.

7. In a loom, in combination with a tuft-yarn beam bearing tuft-yarns, clamp-arms bearing a yielding clamp, the yielding clamp, and means for actuating the clamp to engage the tuft-yarns between the beam and their free ends, all substantially as described.

8. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp, means for supporting the clamp, means for moving it to a position adjacent to the tuft-yarn beam, and means for moving it to engage the tuft-yarns borne on the beam, all substantially as described.

9. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp, means for supporting the clamp, means for guiding the clamp to a position near the tuft-yarn beam, means for moving said clamp to said position, and means for causing the clamp to engage the tuft-yarns, and a guide-pin in engagement with the guide-surface on the clamp-arm, all substantially as described.

10. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp, means for supporting the clamp, a sprocket-wheel shaft, a spring holding the clamp-arm normally in engagement with the sprocket-wheel shaft, a guide-surface on the clamp-arm in engagement with the sprocket-wheel shaft to guide said arm to its position adjacent to the tuft-

yarn beam, means for moving the clamp to said position, and means for causing it to engage the tuft-yarns, all substantially as described.

5 11. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp, means for supporting the clamp, a frame pivoted to one end of the clamp-supporting means and secured to a lifting-shaft, the lifting-shaft, a lifting-rod connected with the lifting-shaft and in
10 operative engagement with a lifting-cam, and a lifting-cam, all substantially as described.

12. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp, means for supporting the clamp, a frame adjustably pivoted to one end of the clamp-supporting means and secured to a lifting-shaft, the lifting-shaft, a lifting-rod connected with the lifting-shaft and in operative engagement with a
15 lifting-cam, and the lifting-cam, all substantially as described.

13. In combination with a tuft-yarn beam bearing tuft-yarns, a clamp, means for supporting the clamp, a frame pivoted to the clamp-supporting means and adjustably secured to a lifting-shaft, the lifting-shaft, an adjustable rod connected with the lifting-shaft and in operative engagement with a
25 lifting-cam, and the lifting-cam, all substantially as described.

14. In a loom, in combination with a tuft-yarn beam bearing tuft-yarns, a frame supporting a clamp and adjustably secured to supports borne on the lifting-shaft, the lifting-shaft, the supports adjustably secured to
35 the lifting-shaft, a lifting-rod connected with

the lifting-shaft and in operative engagement with the lifting-cam, and the lifting-cam, all substantially as described.

15. In a loom, in combination with a tuft-yarn beam bearing tuft-yarns, a frame secured to a lifting-shaft, the lifting-shaft, a clamp pivoted to the frame, a lifting-rod connected to the lifting-shaft, the lifting-cam for operating the lifting-rod, a rock-shaft bearing the lifting-shaft, a clamp-rod connected with the rock-shaft, and a cam for operating the clamp-rod, all substantially as described.
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16. In a loom, in combination with a tuft-yarn beam bearing tuft-yarns, a frame having a clamp pivoted thereto, means for swinging the frame in a vertical plane, a rock-shaft pivotally connected with the frame, a bent lever secured to the rock-shaft, a spring secured to one arm of the bent lever, a clamp-rod secured to the other arm of the bent lever and in operative engagement with a cam on the cam-shaft, and the cam, all substantially as described.
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17. In a loom, in combination with a tuft-yarn beam bearing tuft-yarns, a clamp-arm supporting a clamp, a cam on the arm forming a guide-surface in engagement with a guide-pin, a guide-pin, and means for moving the clamp to engage the tuft-yarn borne on the beam, all substantially as described.
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