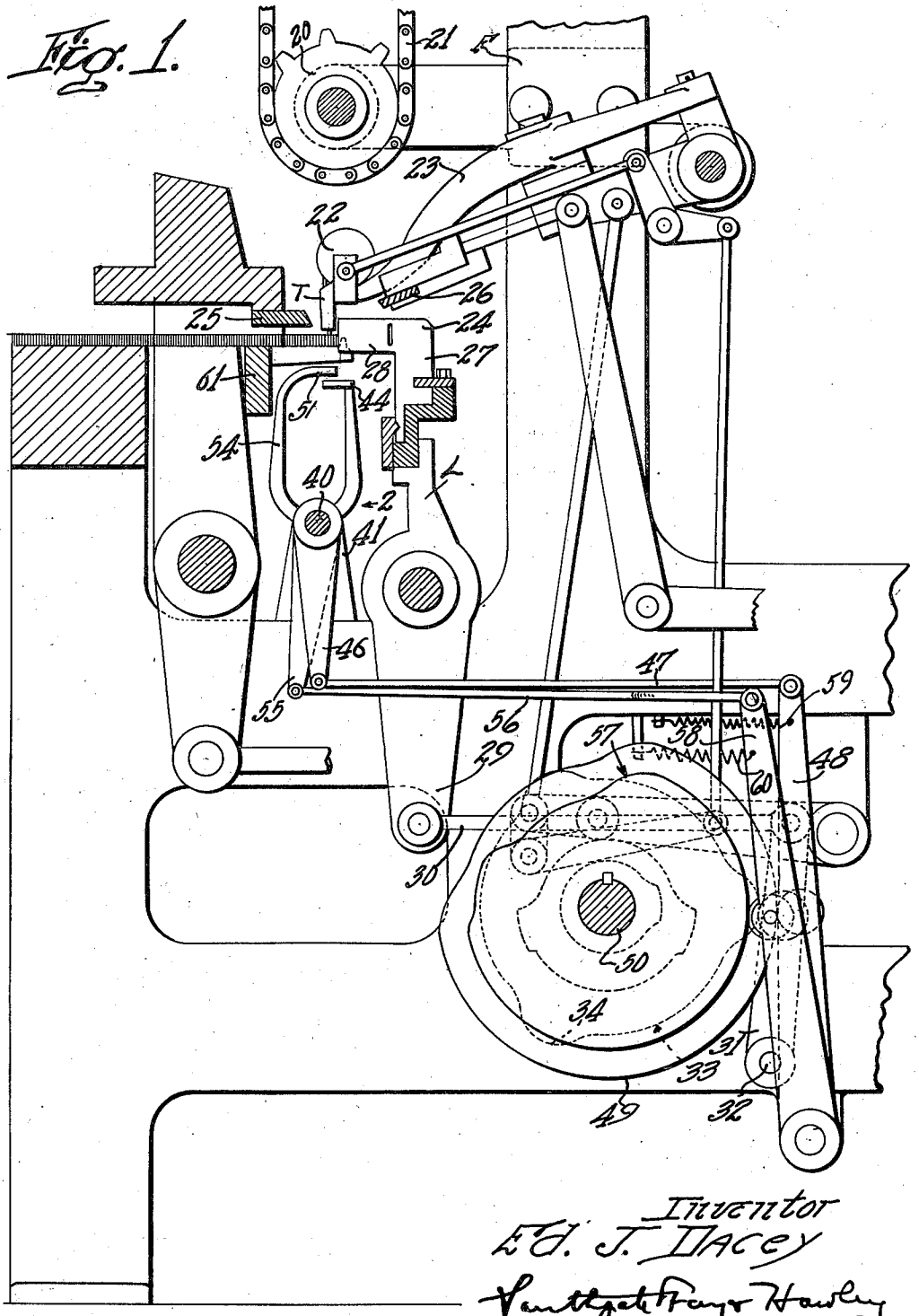
June 8, 1937. E. J. DACEY 2,082,875

LOOM FOR WEAVING TUFTED PILE FABRIC

Filed Oct. 12, 1933 3 Sheets-Sheet 1

Fig. 1.



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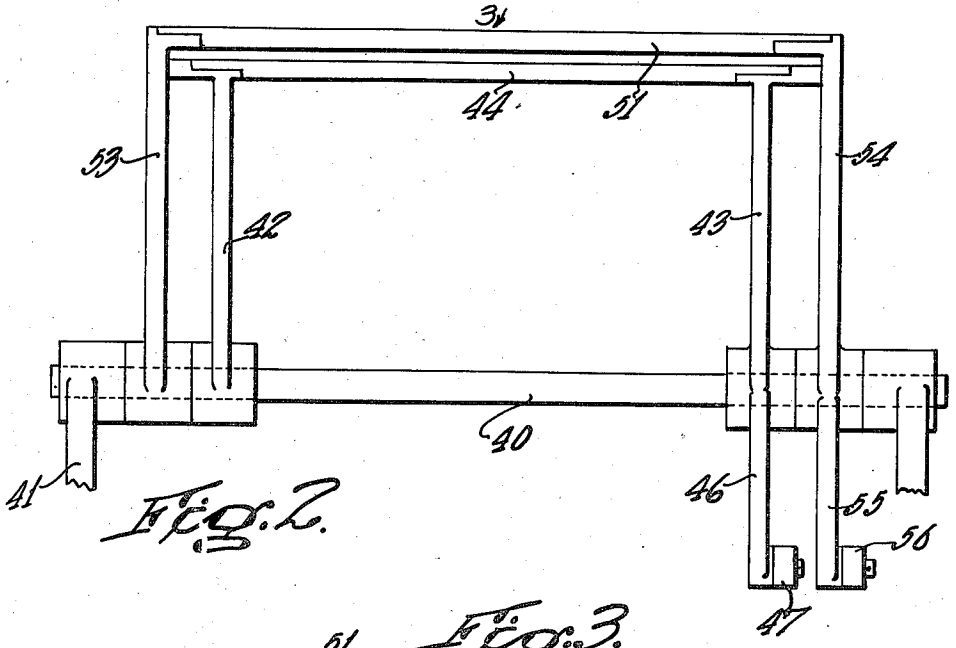


Fig. 2.

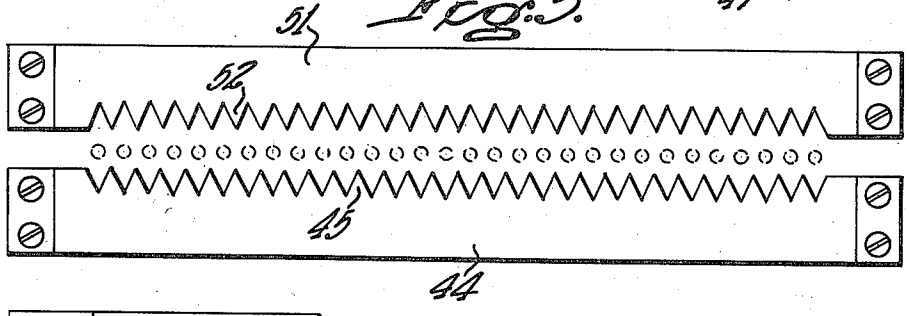


Fig. 3.

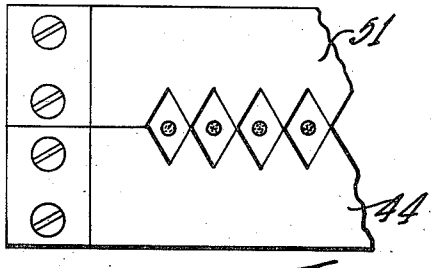


Fig. 4.

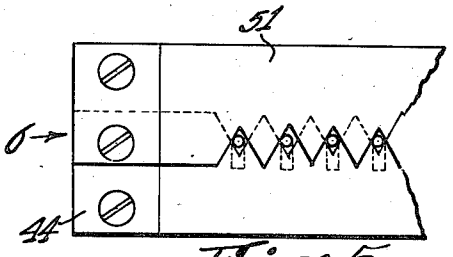


Fig. 5.

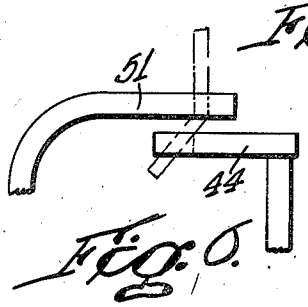


Fig. 6.

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LOOM FOR WEAVING TUFTED PILE FABRIC

Filed Oct. 12, 1933 3 Sheets-Sheet 3

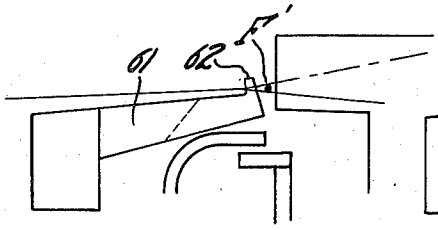


Fig. 7.

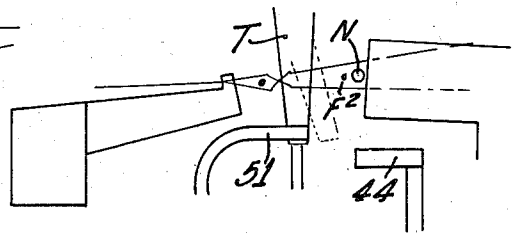


Fig. 8.

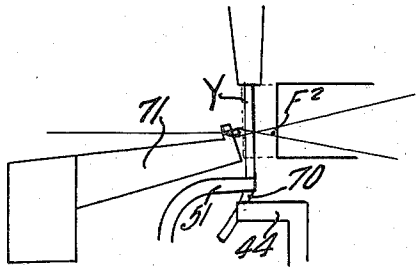


Fig. 9.

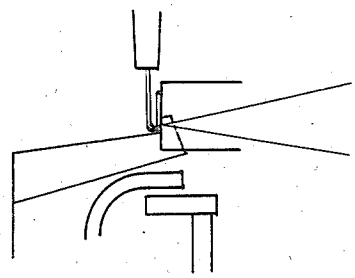


Fig. 10.

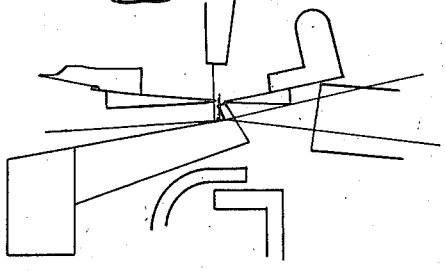


Fig. 11.

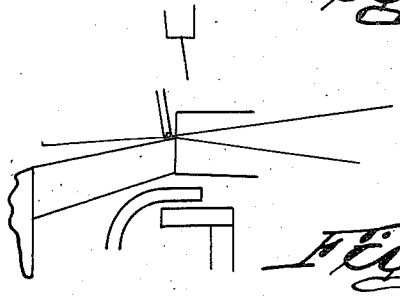


Fig. 12.

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UNITED STATES PATENT OFFICE

2,082,875

LOOM FOR WEAVING TUFTED PILE FABRIC

Edward J. Dacey, Philadelphia, Pa., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application October 12, 1933, Serial No. 693,333

11 Claims. (Cl. 139—9)

This invention relates to improvements in looms of the Axminster type for weaving fabrics having the pattern showing on the back and it is the general object of the invention to provide simple means for aligning the projecting tuft forming yarns of the tube frame preparatory to bending into tuft form.

The usual Axminster loom operates with a transporting chain having a number of tube frames which are moved one at a time to tuft forming position. Mechanism is provided for dipping the frame so that the yarn tubes extend between and through the shed defined by the warp threads of the loom, the color yarns thereby being placed below the shed. Fabrics of the type under consideration preferably are made with a soft cotton filling subject to crimping when the warps cross to cause shrinking of the fabric, and in order to preserve the warp threads in proper alignment a nose board or the like is usually employed. The tuft yarns are projected rearwardly and upwardly between the reed dents as the shot behind the tuft yarns is beaten over the hooks of the nose board. It is quite important that the free projecting ends of the color yarn move between the reed dents as the lay advances, since failure of any of the tuft yarns to enter the proper reed spaces will result in an imperfection both in the face and back of the fabric.

It is an important object of my present invention to provide guides preferably in the form of notched plates which are independently movable so as to produce a bend or bight in the tuft yarns the effect of which will be to place them in alignment with the reed dents. The latter can pass between the yarns, after which the free yarn ends can be drawn up between the correct binder warps when the tufts are formed.

It is a further object of my invention to provide means to exert a straightening strain or force on the tuft yarns as they are approached by the reed dents, thereby enabling the latter to pass between the yarns.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a vertical longitudinal section through a portion of an Axminster loom having my invention applied thereto, the reed being shown in beating up position,

Fig. 2 is a detail rear elevation taken in the direction of arrow 2, Fig. 1, showing the supports for the notched bars,

Fig. 3 is a top plan view on an enlarged scale taken in the direction of arrow 3, Fig. 2, showing the notched bars separated and the color yarns inserted between them,

Fig. 4 is a view similar to a portion of Fig. 3 but with the plates moved closer together,

Fig. 5 is a view similar to Fig. 4 but with the plates having their notched edges overlapped to define restricted guides for the tuft yarns,

Fig. 6 is an end view taken in the direction of arrow 6, Fig. 5, and

Figs. 7 to 12 are diagrammatic views showing successive positions of the yarn guides and associated parts.

Referring to the drawings, the loom frame F supports a pullover sprocket 20 around which is trained a transporting chain 21 to carry the tube frames one of which is shown at 22 detached from the chain. Tube frame presenting and declutching mechanism 23 of the usual construction may be employed and serves to roll the tube frame so that the tuft tubes T project rearwardly toward the reed 24 during the first part of the wiping-in motion, after which the tube frame is caused to assume the erect position shown in Fig. 1. Front and back knives 25 and 26 may operate in the usual manner to sever the tuft ends from the supply of yarn carried by the tube frame.

The lay L may be operated substantially as heretofore or as shown in co-pending application Serial No. 575,190, but as herein set forth is modified so that the type of reed dent shown in Fig. 1 may be employed. This dent comprises an upright part 27 and a forwardly extending part 28, the front edge of each dent moving in the path similar to that of the usual reed. An arm 29 operated by a link 30 derives its motion for actuating the lay from a lever 31 pivoted at 32 to the loom frame and actuated by a cam 33 having three cam points 34. The disclosure herein is in connection with a three-shot fabric and for this reason the cam 33 has three of the points 34, but I do not wish to be limited to this type of cam 33.

The matter thus far described, except as indicated, may be of the usual construction and operates substantially as set forth in the aforesaid application.

In carrying my invention into effect I preferably extend across the loom a shaft 40 held in fixed supports 41 mounted on the loom frame. There are mounted pivotally on this shaft two upwardly extending arms 42 and 43 on the top of which is mounted a transverse bar 44, see Fig. 2. This bar has its forward face notched as at 45, the teeth or the like being spaced apart to correspond to the space between binder threads, a usual dimension being 1/7 of an inch. A depending arm 46 is provided to rock the bar 44 back and forth by means of power transmitted through a link 47 connected to a lever 48. The latter derives motion from a cam 49 which is

keyed to the bottom or cam shaft 50 of the loom and as set forth herein this cam makes one complete revolution for three picks of the loom.

A second notched bar 51 having its rear edge toothed as at 52 is mounted on the upper end of arms 53 and 54 movable pivotally about the shaft 40. A depending arm 55 operated by link 56 gives the bar 51 back and forth oscillations above plate 44. A cam 57 actuates cam lever 58 attached to the rear end of the link 56. Springs 59 and 60 act to hold the levers 48 and 58, respectively, against their cams.

In operation, referring to Figs. 7 to 12, the needle N may lay a shot of filling F′ which will be beaten by the reed to a position immediately behind the nose board 61 as shown in Fig. 7 without being beaten over the hooks 62, notched bars 44 and 51 being forward. The reed then recedes, the sheds change, the tube frame dips the yarn tubes T down through the sheds as shown in Fig. 8, and the needle lays a second shot of filling F^2. There is a corresponding movement of the notched bars from their normal position shown in Fig. 7 to that shown in Fig. 8, the bar 44 being moved rearwardly sufficiently to permit free movement of the yarn tubes and the yarns projecting therefrom, and the upper forward plate 51 being projected rearwardly just far enough to cause the several yarn tubes of the tube frame to enter the notches or teeth 52. While I prefer to have the bottoms of the yarn tubes enter these notches, yet this is not essential, and by varying the adjustment for the mechanism for moving the tube frames, the plates 52 can be caused to position the yarns at points immediately below the bottoms of the yarn tubes.

After the tube frame has been partly wiped in so that the tube frame assumes a position similar to that shown in dotted lines in Fig. 8 with the yarn tubes in advance of the bar 44, the latter will start to move forwardly toward the bar 51 until these two bars assume some such a position as shown in Fig. 9. At the same time that bar 44 is advancing the yarn tubes move to the vertical position shown in full lines in Fig. 8 and thereafter are raised so that the tubes are out of the path of the advancing reed. The overlapping of the bars produce a bight 70 in the yarn Y, the strain thus imposed straightening the yarns between the tubes and the bar 51.

It is while the yarns which lie above the bar 51 are thus held straight that the reed dents move forwardly from the full to the dotted line position shown in Fig. 9, being able to pass between the yarns because they are spaced by the notches of bar 51. The alignment of the yarns permitting correct entry of the reed dents between them is an important function of the bars 44 and 51. The notches of the upper bar register with the yarn tubes, and for convenience I have shown notches on the lower bar 44, which also are of the same gauge as those of the upper bar, but the purpose of the lower bar is to place a strain on the lower ends of the tuft yarns and any form of bar which will accomplish this result will produce the alignment of the tuft yarns between the bar 51 and the yarn tubes.

On the second forward beat of the lay shot F^2 will be moved up the rear inclined faces of the fingers 71 the effect of which is to exert a strain on the tuft yarns tending to move the lower ends of them rearwardly between the reed dents. The reed will force shot F^2 against the tuft yarns and the latter against shot F′ with the result that all of these will be moved over the hooks 62. When this latter movement occurs the free ends of the tuft yarns will snap upwardly to the position shown in Fig. 10, being guided to move in their proper planes by the reed dents. Thereafter the tube frame can be given a further upward movement to pull off yarn for the next row of tufts and the cutters can be operated as shown in Fig. 11 to sever the tuft from the tube frame leaving the parts in the position shown in Fig. 12.

It is to be understood that the cams 49 and 57 have contours to accomplish the movements of the bars 44 and 51 already described. I do not wish to be limited specifically to this mode of operation, however, since certain variations may be made therein without departing from the spirit of the invention. For instance, when the parts are in the position shown in Fig. 9 I may move the bar 51 rearwardly toward the advancing reed to still further insure alignment of the tuft yarns so that the lower ends thereof will pass upwardly in correct relation without being deflected laterally. The reed is formed to permit the bars to move under the dents, as suggested in Figs. 7 and 12.

From the foregoing it will be seen that I have provided simple means for keeping the projecting yarns on the tube frame in proper alignment so that the reed dents can enter between them. The means preferably comprises a pair of notched plates which are brought into action after the tuft yarns are projected through the warp threads to cause alignment with the reed, these plates being manipulated as desired to facilitate entry of the dents between the color yarns. While I have shown the shot of filling F′ as being left behind the nose board on the first beat of the lay, yet I do not wish to be limited to this mode of operation. Furthermore, the bars are capable of relative movement to subject the yarns to continuing strains when the dents approach them, thereby insuring correct alignment. The reed dents pass between the tuft yarns before the latter move away from the notched bars, hence any tendency to twist or bend laterally on the part of the tuft yarns when their ends are free will not result in misalignment, since the yarns are already caught between the dents, and such ends will be drawn up through the spaces between the dents.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a loom for weaving tuft pile fabrics and operating with warp threads, a reed having dents, a tube frame having yarn tubes from which tuft forming yarns project, a bar having notches therein, means to move the bar to cause the notches to register with the yarn tubes when the tube frame is projected through the warp threads, a second bar with notches therein positioned for engagement with the tuft yarns, and means to separate the bars to facilitate entry of the tuft yarns between them and thereafter cause the bars to approach each other to engage and align the tuft yarns with the reed dents as the reed advances.

2. In a loom for weaving tuft pile fabrics operating with warp threads, a reed having dents, a tube frame having tuft tubes to be projected through the warp threads of the loom and from which project tuft yarns, a pair of bars having their adjacent edges notched, means to separate

said bars to facilitate entry of the tuft yarns between said bars, and means to thereafter cause the bars to move together to engage and straighten the tuft yarns and cause the latter to be aligned with the reed dents.

3. In an Axminster loom operating with warp threads, a reed having dents, a tube frame having yarn tubes from which project tuft forming yarns, means located permanently under the warp threads movable to engage and place a strain upon the free ends of the tuft yarns to straighten the same, mechanism to move the reed dents between the straightened tuft yarns and over said means, and means to thereafter move the tuft yarns upwardly between the reed dents in a tuft forming operation.

4. In an Axminster loom operating with warp threads, a reed having dents, a tube frame having tubes from which project tuft yarns, means located permanently under the warp threads and extending longitudinally across the loom defining devices movable to position and place a strain upon the free ends of the tuft yarns, and mechanism to move the reed dents between the straightened tuft yarns and over the means, the yarns thereafter being acted upon to move between the reed dents in a tuft forming operation.

5. In an Axminster loom, a movable reed having dents spaced apart by a given distance, a tube frame having yarn tubes spaced apart by the said given distance and having projecting therefrom tuft forming yarns, a device having means to engage and space the free ends of the tuft yarns by distances equal to said given distance, a second device extending transversely of the tuft yarns to act upon the latter to place a strain upon the latter and movable to straighten that part of the yarns between the first device and the tubes, one of said devices being above the other and said devices movable in vertically spaced substantially horizontal paths, said devices movable toward each other to engage each tuft yarn at two vertically spaced points to bend said yarn, and means to thereafter move the dents into the spaces between the straightened parts of the tuft yarns, the latter thereafter moving between the dents in a tuft forming operation.

6. In an Axminster loom, a reed having dents, a tube frame to present a supply of tuft forming yarns, the upper ends of the yarns being held to the tube frame, means movable under the reed dents to engage and straighten the lower free ends of the tuft yarns, and means to move the reed dents over the movable means and between the straightened yarns, said dents moving between the tube frame and the means, the tuft yarns thereafter being movable between the reed dents in a tuft forming operation.

7. In an Axminster loom operating with warp threads, a reed having dents, a tube frame having yarn tubes from which project tuft forming yarns, a notched bar extending across the loom to engage and align the free ends of the tuft yarns with the spaces between the reed dents, a second bar extending across the loom below the first bar having provision for engaging and placing a strain upon the free ends of the yarns to hold the latter substantially parallel, and mechanism to move the reed dents between the straightened tuft yarns and over both bars, the yarns thereafter being movable between the dents in a tuft forming operation, both of said bars being permanently below the warp threads.

8. In an Axminster loom, a reed having dents, a nose board having spaced fingers between which the reed dents move, a tube frame having tubes from which tuft forming yarns extend, means extending across the loom to engage the free ends of the tuft yarns to place a strain on and straighten said yarns, and mechanism to move the reed dents over said means and between the tube frame and said means to cause the dents to pass between the straightened parts of the tuft yarns, said dents thereafter effective to move the tuft yarns over the fingers in a tuft forming operation, the free ends of the tuft yarns moving between the reed dents in said tuft forming operation.

9. In an Axminster loom operating with warp threads, a reed having dents movable between the warp threads, a tube frame above the warp threads having yarn tubes to be inserted between the warp threads and having tuft yarns to project from the tubes through the warp threads, a pair of similar means located below the warp threads, one of said means located above the other and both of said means movable in vertically spaced substantially horizontal paths and movable toward each other to engage each tuft yarn at two vertically spaced points to bend and exert a strain on the free ends of the tuft yarns extending below the warps to straighten and align said yarns with the spaces between the reed dents, and means to move the dents between the straightened tuft yarns, said tuft yarns thereafter moving between and being guided by the reed dents in a tuft forming operation.

10. In an Axminster loom operating with warp threads, a reed having dents spaced apart a given distance, a tube frame above the warp threads having yarn tubes spaced apart the same given distance and from which tuft forming yarns project having free ends to extend below the warp threads, means extending longitudinally across the loom under the warp threads presenting devices separated by the said given distance, one of said devices being above the other and said devices movable in vertically spaced substantially horizontal paths, said devices movable toward each other and engaging each tuft yarn at two vertically spaced points to bend the yarn to assist in producing a strain on the free ends of the yarns to straighten the latter, and mechanism to move the dents into the spaces between the straightened tuft yarns and over said means, the yarns thereafter being movable between the dents in a tuft forming operation.

11. In a loom for weaving tuft pile fabrics and operating with warp threads, a reed having dents, a tube frame having yarn tubes from which project tuft yarns, means to lower the tube frame to insert the yarn tubes between the warp threads, means thereafter movable toward the yarn tubes and having notches for the tubes, means movable thereafter to engage the projecting tuft yarns to straighten the same, means then operative to raise the tube frame to raise the yarn tubes above the notches, the third means thereupon tending to move the tuft yarns into the notches, means then operative to move the reed dents to positions between the aligned tuft yarns, and means thereafter to move the tuft yarns upwardly between the reed dents in a tuft forming operation.

EDWARD J. DACEY.