May 2, 1933. D. J. BOUCHARD ET AL 1,906,308

TUFT PILE FABRIC LOOM

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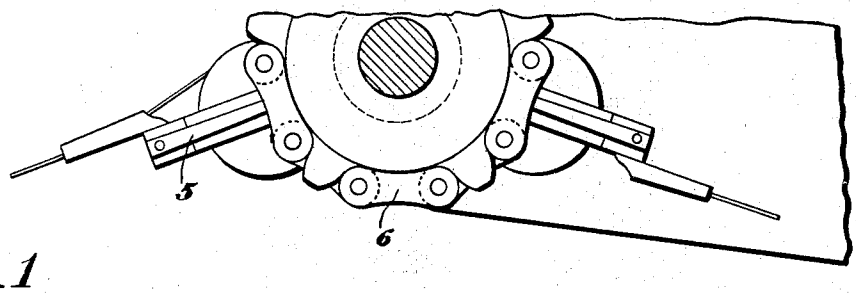
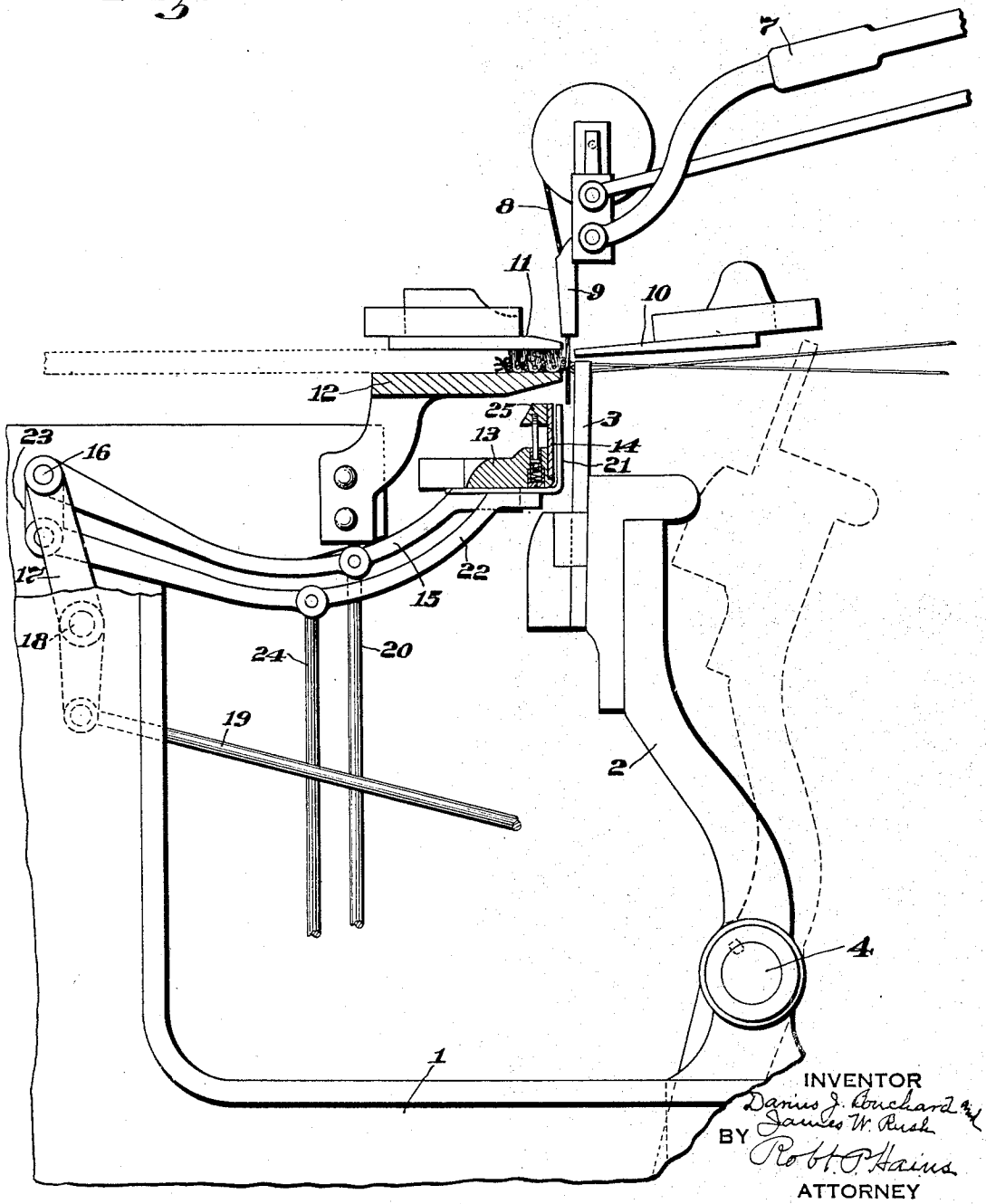


Fig. 1



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Fig. 2

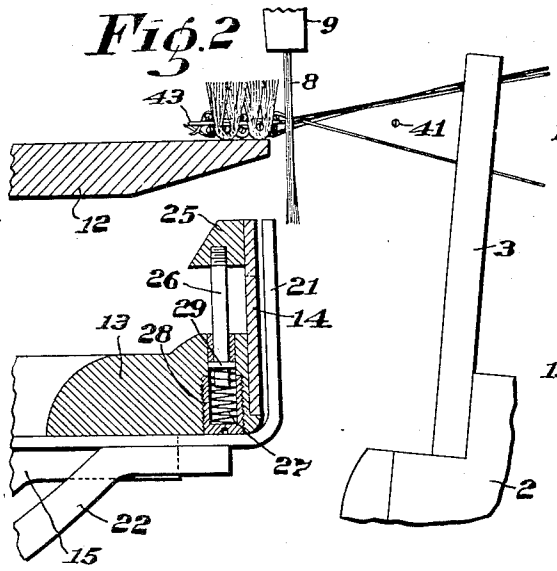


Fig. 3

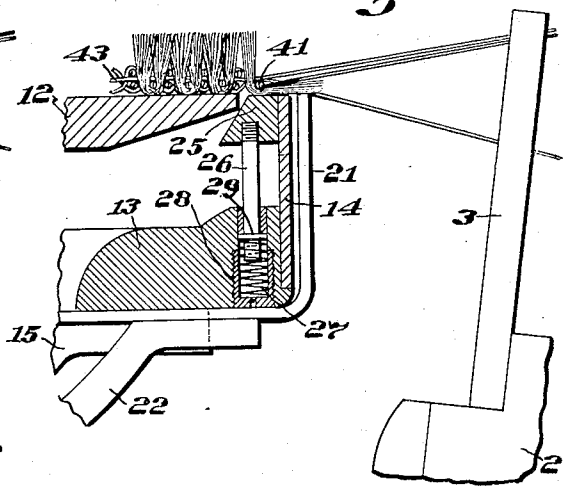


Fig. 4

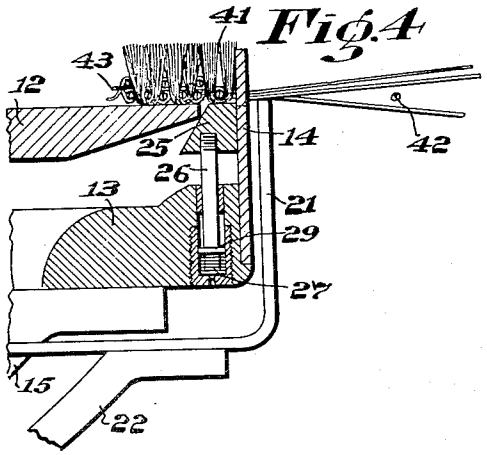


Fig. 5

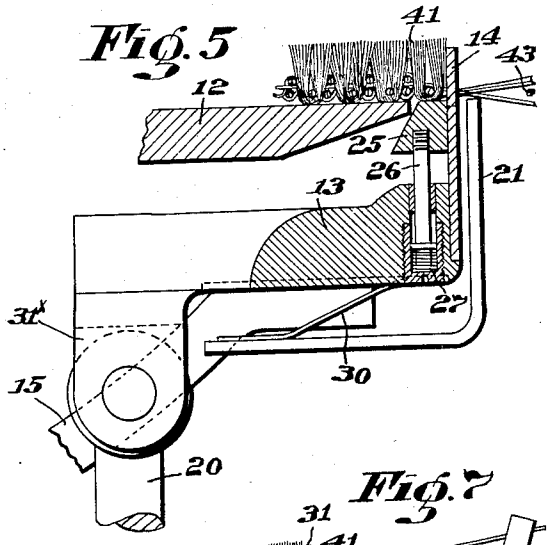


Fig. 6

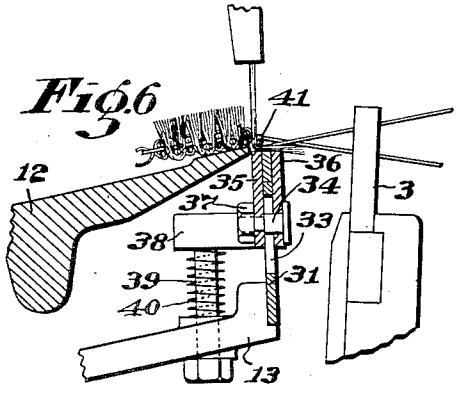
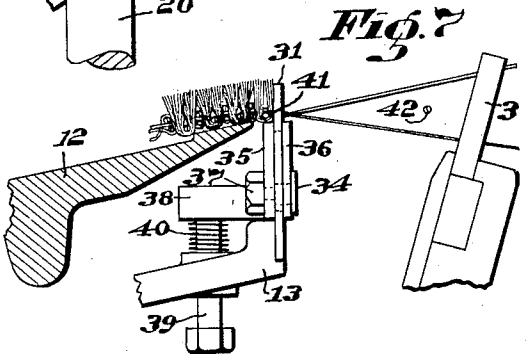


Fig. 7



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UNITED STATES PATENT OFFICE

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TUFT PILE FABRIC LOOM

Application filed May 18, 1932. Serial No. 612,004.

This invention relates to tuft pile fabric looms and more particularly to looms of this general type provided with means for the production of a close weave in the ground fabric and a well defined pattern of the pile surface on the back.

Tuft pile fabrics, such for instance as Axminster and like carpets and rugs, as now ordinarily woven, are open to the objection that the ground fabric presents a loose weave and the pile forming tufts are not firmly drawn and secured about the tuft holding weft shots, with the result that the pile forming tufts fail to satisfactorily reproduce the pattern of the pile surface on the back and, in many instances, the pile forming tufts or some of them work loose and become detached from the ground fabric, so that the pattern on the back, as well as the pile surface, becomes distorted and unsatisfactory.

One of the objects of the present invention is to provide a loom of the tuft pile fabric type with means whereby the objections heretofore existing in the resulting fabric may be eliminated, a close weave of the ground fabric be secured, and a well defined pattern of the pile surface be reproduced upon the back of the finished fabric.

In accordance with the present invention the comb has associated therewith a tuft loop support which, when the comb is given its put out and put up movements, as usual, partakes of the comb movement to engage and support the loops of the last row of tufts and below the holding weft shot until near the completion of the beat up movement of the tuft binding weft shot, with the result that the loops of the tufts are drawn tightly about the holding weft shot and produce a well defined pattern of the pile on the back.

As another feature of the invention also the comb and tuft loop engaging and supporting member have associated therewith a comb plate which acts to turn the depending leg of the pile forming tufts towards the warp threads whereupon the comb turns the legs of the tufts upwardly between the warp threads while the loop engaging and supporting member engages the loops of the tufts below the holding weft shot during and subsequent to the tuft formation.

The invention and novel features thereof will best be made clear from the following description and accompanying drawings which show the invention as associated with an Axminster loom.

In the drawings:—

Fig. 1 shows sufficient portions of an Axminster loom to make clear the association of the invention therewith, some of the parts being shown in section;

Fig. 2 is an enlarged detached detail, parts in section, showing the first step in the tuft formation;

Fig. 3 is a like view showing the projecting ends of the tufts as having been turned upwardly towards the warp threads by the comb plate and the tuft loop supporting member as engaged with the loops of the tufts below the holding weft shot;

Fig. 4 is a similar view showing the relation of parts when the comb has turned the legs of the tufts upwardly between the warp threads;

Fig. 5 is a view similar to that of Fig. 4 showing the slightly modified form of the invention;

Fig. 6 is a sectional side elevation of a modified form of the invention showing the depending legs of the tufts as having been turned upwardly toward the warp threads and the tuft loop supporting member as engaged with the loops of the tufts below the holding weft shot; and

Fig. 7 is a side elevation showing the comb as having been inserted between the warp threads.

The invention as herein shown is associated with the usual parts of an Axminster loom and only so much of the latter is illustrated as is necessary for an understanding of the invention and its operative relation with the loom parts.

Referring to Fig. 1 the loom frame 1 may be of usual construction suitable for the support of the operating parts. The lay 2 carrying the reed 3 is mounted for rocking movement on the shaft 4 and is given its

rocking movements, as usual, from a going part of the loom.

In looms of the Axminster type, as shown, the pile forming tuft yarns are carried on tube frames 5 which are mounted on a carrier or chain 6. The carrier or chain 6 is given step-by-step movements as usual to present succeeding tube frames to the transferrer 7 whereby the pile tuft forming yarns are presented to the weaving point. The tuft forming yarns 8 pass through the usual tubes 9 and extend downwardly therefrom, as indicated, and when the pile forming tufts have been turned about the holding weft shot suitable cutters 10 and 11 serve to part or cut the tuft forming yarns from the supply.

Mounted on the loom frame is the breast plate 12 over which the fabric passes as it is woven and below the breast plate the comb, the comb plate, and tuft loop supporting member are mounted for put out and put up movements, as will be more fully explained.

As indicated in Fig. 1 the comb bar 13 carries a comb 14 which is constituted as a toothed member as usual to enable the comb to pass upwardly between the warp threads, and the comb bar 13 is mounted upon a carrier 15, the front end portion of which is pivotally connected at 16 to the upper arm of the lever 17 pivoted to the loom frame or an appropriate support at 18. The lower arm of the lever 17 is connected to a rod or actuator 19 which is given reciprocating movements from a going part of the loom.

The comb carrier 15 is connected to a rod 20 which extends downwardly, and is given a rising and lowering movement from a going part of the loom, the combined action of the rods 19 and 20 being to impart to the comb bar and comb put out and put up movements to carry the pile forming tufts upwardly between the warp threads.

Associated with the comb and comb bar is a comb plate 21 located back or rearward of the comb and such comb plate has likewise a put out and put up movement corresponding generally to the like movements imparted to the comb.

As shown in Fig. 1 the comb plate 21 is mounted on a comb plate carrier 22, the front end portion of which is connected to the lever 17 or an arm 23 secured thereto.

The comb plate carrier 22 is given its rising and lowering movements through a rod 24 connected to a going part of the loom, the construction being such with respect to the comb and comb plate that each is given a put out and put up movement, first, to cause the comb plate to turn the downwardly extending end of the pile forming tufts towards the warp threads whereupon the comb plate is brought to rest by engagement with the warp threads while the comb 14 proceeds upwardly to turn the loops of the pile forming tufts between the warp threads to complete the tuft formation about the holding weft shot.

One of the objections existing in looms of this general type is that the backing fabric is not woven sufficiently close and that the pile forming tufts are not drawn tightly about the holding weft shot by the binding weft shot, thus the tufts frequently work loose or become detached and an unsatisfactory pattern on the back is produced.

In accordance with the present invention the pile forming tufts constituting the last row are supported back of the rear edge of the breast plate during and subsequent to the tuft formation, so that the binding weft shot is able to draw the tufts tightly about the holding weft shot with the production of a well defined and saisfactory pattern of the pile on the back.

Mounted on the comb bar 13 is the tuft loop supporting member 25 located adjacent to and frontward of the comb 14, the result being that on the put out and put up movements of the comb and comb bar the tuft loop supporting member 25 engages the loops of the last row of tufts back of the rear edge of the breast plate and serves to support and hold the loops of the tufts about the holding weft shot during and subsequent to the tuft formation.

As indicated in Figs. 2, 3, 4 and 5 the tuft loop supporting member 25 is constituted as a bar extending transversely of the loom closely adjacent to the comb 14 and is yieldingly mounted on the comb bar for movement therewith and relative thereto. The tuft loop supporting member 25, as shown in Figs. 2, 3, 4 and 5 is mounted upon pins 26, of which there may be an appropriate number transversely of the loom and the lower ends of the pins 26 extend into recesses formed in the comb bar 13 and the lower ends of the pins are under the influence of light springs 27 so that upon put out and put up movements to the comb bar and comb, the tuft loop supporting member 25 will rise with the comb until it meets the loops of the last row of tufts, as indicated in Fig. 3, to hold and support the loops during the tuft formation and as the comb rises to turn the rear legs of the tufts upwardly between the warp threads the springs 27 yield to permit the loop supporting member 25 to exert a pressure upon the loops of the last row of tufts and hold them until near the completion of the beat up movement of the binding weft shot.

In the present instance of the invention, as indicated in Figs. 2, 3, 4 and 5, the comb bar has an opening formed in its lower side into which is threaded a sleeve 28 and the pins are each provided with a flange 29

between which and the lower end of the sleeve 28 is the spring 27.

The yielding support of the tuft loop supporting member 25 may be variously contrived, the essential being that the loop supporting member 25 be mounted adjacent the comb for movement therewith.

Instead of mounting the comb plate 21 for actuation in its put out and put up movements by the plate carrier 22, the comb plate 21 may be connected to the comb bar 13 by means of one or more springs 30, as indicated in Fig. 5, so that when the comb bar and comb plate are given their put out and put up movements the comb plate will turn the downwardly extending legs of the pile forming tufts towards the warp threads and be arrested on engagement with the warp threads, as indicated in Fig. 5, while the comb bar and comb may continue the upward movement to turn the legs of the tufts upwardly between the warp threads.

In the modification shown by Fig. 5 the comb bar 13 is supported and actuated by the comb bar carrier 15 and as a convenient means for imparting the rising and lowering movements to the comb bar the actuating rod 20 may be conveniently connected to the comb bar by the downwardly extending lugs 31^x.

Figs. 6 and 7 show a slightly modified form of the invention as hereinbefore described, in which the tuft loop supporting member and the comb plate are mounted on the comb and connected to the comb bar through yielding means to permit the tuft loop supporting member and the comb plate to come to rest on meeting the warp threads, one below the holding weft shot and the other rearwardly thereof.

Mounted on the comb bar 13, Fig. 6, is the comb 31 having a slot 33 through which passes a pin 34 connected to the loop supporting member 35 and the comb plate 36. The pin 34 may conveniently take the form, as shown, of a bolt having an enlarged body portion 34 and set up by a nut 37.

Connected to the loop supporting member 35 and the comb plate 36 is an arm 38 to which is connected a pin 39 extending downwardly through an opening in the comb bar 13, as shown, and between the arm 38 and the comb bar is a spring 40 with the result that on the put out and put up movements of the comb bar the loop supporting member 35 and comb plate 36 may come to rest, as indicated in Fig. 6, while the comb may proceed to turn the rear legs of the pile forming tufts upwardly between the warp threads, as indicated in Fig. 7.

When a tube frame is detached from the carrier or chain 6, as indicated in Fig. 1, and is transferred to the weaving point the tuft yarns 8 pass through or between the warp threads, as indicated in Fig. 2, and at this time the comb bar, comb plate and loop supporting member are below the breast plate frontward of the lower leg of the pile forming tufts and a holding weft shot 41 is passed through the shed and beaten up, whereupon the comb bar, comb plate and tuft loop supporting member are given their put out and put up movements to first cause the comb plate 21 to turn the lower legs of the pile forming tufts towards the warp threads and about the holding weft shot 41 and then come to rest. At this time the loop supporting member 25 engages the loops of the last row of tufts below the holding weft shot 41 and the comb plate takes position, as indicated in Fig. 3.

On further put up movement of the comb bar 13, the comb 14 rises between the warp threads while the tuft loop supporting member 25 yields against the light tension of the holding springs. A binding weft shot 42 is then passed through the shed and the beat up movement of the binding weft shot then commences. As the reed 3 moves the binding weft shot frontwardly to bind the loops of the pile forming tufts and just prior to the completion of the beat up the comb bar, comb plate and loop supporting member 25 are withdrawn, but owing to the spring action of the loop supporting bar 25 it continues to hold the loops of the last row of pile forming tufts until the comb has itself been fully withdrawn from between the warp threads, the construction being such that the binding weft shot will practically engage the pile forming tufts while the tufts themselves are supported by the loop supporting member 25 or soon after they are released by the holding member.

The effect of the operation is that the binding weft shot is able to draw and tighten the loops of the tufts about the holding weft shot and produce a close weave of the ground fabric with a well defined pattern of the pile on the back.

In the present instance of the invention the tuft pile fabric is of the two plane type with a stuffer warp 43 between the upper and lower weft shots which are bound together by the usual chain or binder warp threads but, of course, it is to be understood that the present invention is applicable advantageously to other types or construction of tuft pile fabrics, wherein the pattern of the pile surface is reproduced upon the back of the fabric by the pile forming tufts which pass about the back holding weft shots and are bound securely in place and anchored to the fabric by the binding weft shots.

What is claimed is:

1. In a tuft pile fabric loom, the combination of a comb bar, a comb carried by the comb bar, means for imparting a put out.

and put up movement to the comb bar and comb in the formation of the pile forming tufts, and a tuft-loop supporting member connected to the comb bar for vertical yielding movement relative to the comb to support the loops of the rear row of tufts below and about the holding weft shot during the put up movement of the comb and the tuft forming operation.

2. In a tuft pile fabric loom, the combination of a comb, a comb plate rearward of the comb and mounted to yield vertically relative thereto, means for imparting put out and put up movements to the comb and comb plate to first, cause the comb plate to turn the leg of the pile forming tuft towards the warp threads and then be arrested by the warp threads and second, to cause the comb to turn the leg upwardly between the warp threads and about the holding weft shot, and a tuft loop support frontward of the comb for supporting the loops of the tufts below the holding weft shot.

3. In a tuft pile fabric loom, the combination of a comb, a comb plate rearward of the comb, means for imparting put out and put up movements to the comb and comb plate to first, cause the comb plate to turn the leg of the pile forming tuft towards the warp threads and second, to cause the comb to turn the leg upwardly between the warp threads and about the holding weft shot, and a tuft loop supporting member movable with the comb to support the loops of the rear row of tufts below the holding weft shot during the tuft forming operation.

4. In a tuft pile fabric loom, the combination of a comb bar, a comb mounted on the comb bar, means for imparting put out and put up movement to the comb bar to cause the comb to turn the legs of the pile forming tuft upwardly between the warp threads, and a tuft loop supporting member yieldingly mounted on the comb bar for movement relative to the comb and to be arrested by the warp threads as the comb completes its put up movement and turns the legs of pile forming tufts upwardly and for supporting the base of the pile forming tufts below the holding weft shot during the formation of the tufts.

5. In a tuft pile fabric loom, the combination of a breast plate over which the fabric passes as it is woven, a comb bar having a comb fixedly mounted on the comb bar, means for imparting put out and put up movement to the comb, a tuft loop supporting member yieldingly mounted on the comb bar with respect to and frontward of the comb to engage the base of the loops of the tufts during the comb movement and then yield and support the loops as the comb passes upwardly through the warp threads and completes the formation of the pile forming tufts.

6. In a tuft pile fabric loom, the combination of a comb bar and comb, a comb plate at the rear of the comb, means for imparting put out and put up movements to the comb plate and comb to first, cause the comb plate to turn the legs of the row of tufts towards the warp threads, and second, cause the comb to turn the legs of the tufts upwardly between the warp threads, and a tuft loop supporting member mounted on the comb bar frontward of the comb to engage and support the loops of the tufts below the holding weft shot during the formation of the tufts.

7. In a tuft pile fabric loom, the combination of a comb bar and comb, a comb plate at the rear of the comb, means for imparting put out and put up movements to the comb plate and comb to first cause the comb plate to turn the legs of the row of tufts towards the warp threads, and second, cause the comb to turn the legs of the tufts upwardly between the warp threads, and a tuft loop supporting member yieldingly mounted on the comb bar frontward of the comb to engage and support the loops of the tufts below the holding weft shot during the formation of the tufts.

8. In a tuft pile fabric loom, the combination of a comb bar having a comb, a comb plate rearward of the comb, a tuft loop supporting member frontward of the comb, and means for operating said elements to, first, cause the comb plate to turn the rear legs of the tufts towards the warp threads, second, to cause the comb to turn the legs of the tufts upwardly between the warp threads, and, third cause the loop supporting member to engage and support the base of the loops below the holding weft shot during and subsequent to the formation of the tufts.

9. In a tuft pile fabric loom, the combination of a comb bar having a comb, a comb plate rearward of the comb, a tuft loop supporting member yieldingly mounted on the comb bar frontward of the comb, and means for operating said elements to, first, cause the comb plate to turn the rear legs of the tufts towards the warp threads, second, to cause the comb to turn the legs of the tufts upwardly between the warp threads, and, third, cause the loop supporting member to engage and support the base of the loops below the holding weft shot during and subsequent to the formation of the tufts.

10. In a tuft pile fabric loom, the combination of a breast plate over which the fabric passes as it is woven, a comb bar, a comb mounted in fixed position on the comb bar, a tuft loop supporting member mounted on the comb bar to yield relative to the comb and constituted as a bar extending in

front of the comb to engage and support the loops of the tufts below the holding weft shot back of the rear edge of the breast plate as the comb continues its upwardly movement and until the beat up of the binding weft shot to produce a well defined pattern on the back.

11. In a tuft pile fabric loom, the combination of a breast plate, a comb bar, a comb mounted on the comb bar, a tuft loop supporting member mounted on the comb bar frontward of the comb for vertical movement, yielding means for supporting the loop supporting member, and means for guiding the tuft loop supporting member in its movement towards and from the top of the comb.

12. In a tuft pile fabric loom, the combination of a comb having a put out and put up movement, a comb plate back of the comb for turning the legs of the tufts toward the warp threads, and a tuft loop supporting member frontward of the comb to engage and support the loops of the pile forming tufts as the comb plate and comb act upon the tufts during the tuft forming operation.

In testimony whereof, we have signed our names to this specification.

DARIUS J. BOUCHARD.
JAMES W. RUSH.