FIG. 1

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DOUBLE TUFT FILE FABRIC LOOM

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This invention relates to a novel loom construction for weaving double tuft pile fabrics. 

Tuft pile fabrics may be divided into two general classes; first, those in which the pile surface is formed by looping some of the weaving threads over pile wires during the weaving operation and withdrawing the pile wires to leave a cut or uncut pile surface; and second, those in which the pile surface is produced by pile forming yarns introduced as tufts into the fabric near the weaving point from an extraneous yarn supply. 

Pile fabrics of the second class are generally known as tuft pile fabrics, and may be typified in Axminster carpets or rugs, and the present invention relates to a loom construction for weaving two pile fabrics of this second general class face to face. 

In weaving pile fabrics of the first class wherein the pile surface is produced by pile forming warp threads looped about pile wires, it has been a well known practice to produce such fabrics either singly or double, but in weaving tuft pile fabrics the problem of weaving a double fabric in a single operation presents difficulties due to the fact that the pile forming yarn is taken from an extraneous supply and transferred to the weaving point where it must be presented to both webs being woven. 

The present invention relates to a novel loom construction for introducing the pile forming tuft yarns in both webs of the double fabric for binding these yarns in the fabric as woven so as to produce two separate pile fabrics upon severaling the connecting pile forming yarns. 

One important feature of the present invention resides in yarn carriers or presenters capable of carrying the tuft forming yarns through the sheds so as to lay the yarns across both sheds as the yarn carriers or presenters are withdrawn. 

Another feature of the invention resides in means for manipulating the projecting ends of the inserted pile yarns to loop these ends about the holding wefts. 

A more specific feature of the invention resides in yarn engaging nippers supported for swinging and dipping movement relative to the sheds, and in means for actuating the nippers to clear the adjustable pile bar as the nippers are swung towards the weaving point and for inserting the nippers through both sheds and then withdrawing them to lay the yarns across the sheds; and a further feature resides in means for manipulating the nippers to fold the pile yarns about a holding shot into position to be bound in by the next weft shot. 

Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form thereof. 

In the drawings:— 

Fig. 1 is a vertical sectional view through a loom embodying the features of the present invention; 

Fig. 2 is a side elevation of parts of the loom of Fig. 1; 

Fig. 3 is a front view of the yarn nippers and cooperating parts; 

Fig. 4 is an elevation view of mechanism for opening and closing the nippers; 

Fig. 5 on a larger scale is a sectional view taken on the line 2—2 of Fig. 3; 

Fig. 6 is a transverse sectional view through the nippers of Fig. 3; 

Fig. 7 is a vertical longitudinal sectional view through parts of the loom adjacent the weaving point and shows a tuft pile yarn being advanced by the nippers toward the yarn inserting position; 

Fig. 8 is a similar view showing the yarn carried downwardly through the sheds by the nippers; 

Fig. 9 is a similar view showing the nippers elevated to lay the yarn across the sheds; 

Fig. 10 is a similar view showing the means for looping the ends of the yarns around the holding shots; 

Fig. 11 is a similar view showing the tuft forming yarn secured in place by binding shots; and 

Fig. 12 is an enlarged side sectional elevation showing the warp beams and lead of the warp threads. 

The loom shown in the drawings is of the general Axminster type except as modified in accordance with the present invention to weave a double tuft pile fabric, and only so much of the loom is shown as is required for a complete disclosure of the invention to one experienced in the art of Axminster weaving. 

The loom frame 1 may be given any appropriate construction for the support of the operating parts, and extending upwards thereto are the standards 2 which support appropriate brackets 3 for the usual carrier chains 4 and their operating mechanism. The chains 4 carry the tube frames 5 and are advanced step by step as is usual in Axminster looms to advance the tube frames in the desired order to the yarn.
The yarns may be transferred from this point by employing nippers to carry the yarns from the tube frames into the shed, as shown in the drawings.

In carrying out the present invention it has been found that a double tuft pile fabric may be woven on the ordinary niper type Axminster loom by making comparatively few changes in this type of loom, as will be apparent from the foregoing.

It has been customary hitherto to provide the niper type Axminster loom with a fabric rest plate for use when the pile fabric is woven face up, and these looms have in some cases also been provided with a plate or pile bar for use when the fabric is woven face down, it being intended, in such prior constructions, that one or the other of these plates be used upon the loom but not both at the same time.

This prior loom construction, however, is well adapted for use in carrying out the present invention, for by employing both plates and at the same time and mounting them upon the loom frame the proper distance apart, double tuft pile fabrics of the desired thickness may be woven. The plates and are preferably provided with the blades and adapted to support or engage the pile fabrics adjacent the weaving points, as shown, and provision is made for adjusting the upper plate to vary the length of the pile.

The double fabric a pile woven is drawn forward over the breast beam by the spike or take-up rolls and, one of which engages the lower fabric and the other the upper fabric. The double fabric is to form the two pile fabrics and by the knife which is moved back and forth across the loom in a well known manner.

The various warp yarns provided to form the ground fabric of the upper and lower webs may constitute an upper set of warps and a lower set which may be admitted by the usual harness operating mechanism. The warp threads for one of the two webs are supplied from the two warp beams, while the warp threads for the other web are supplied from the two warp beams. The warp beams are wefted by a weft beam through the controlling harnesses.

In the construction shown in Fig. 7, the two needles and are employed, one for introducing the weft shots in the upper web and the other for introducing the weft shots in the lower web, and the weft shots may be beaten up by a reed as usual, except that the dents of the reed should be long enough to reach across both sheds, as shown.

The reed is pushed by the reed holder and moved from side to side by the weft shots in the weft following the respective warp beams.

In the construction shown the two web needles and are employed, one for introducing the weft shots in the upper web and the other for introducing the weft shots in the lower web, and the weft shots may be beaten up by a reed as usual, except that the dents of the reed should be long enough to reach across both sheds, as shown.

The reed is clamped to the reed holder and moved from side to side by the weft shots in the weft following the respective warp beams.

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The reed is clamped to the reed holder and moved from side to side by the weft shots in the weft following the respective warp beams.

It is important that after the yarns have been introduced in the sheds, as shown in Fig. 9, and the holding wefts and are beaten up, that the projecting ends of the yarns be looped or folded around these respective wefts. Different constructions may be employed to this end and in the construction shown the upper ends of the yarns are folded about the holding shot by the nippers by moving these nippers downwardly in the upper sheds, and then opening the nippers to release the yarns as will be apparent from Fig. 10. A heel is upon each finger of the front niper blade to serve to tuck the folded yarn inwardly, as shown in Fig. 10.

A comb 47 and comb plate are employed in the construction shown to hold the lower ends of the yarns upwardly around the lower holding shot. The comb 47 is secured to a bar 48 and is set in the lower shed by means of the comb bar arms 50 pivoted at 51 to the upper ends of the rocking arms. The arms 52 are secured to the shaft 53 having ex-
tending downwardly therefrom the lever 54 which is rocked by the cam operated link 55 to move the comb 41 rearwardly. The comb bar lifting rod 56 serves to move the comb upwardly through the lower warps, as shown in Fig. 10.

The link in plate 48 is secured to the arms 57, the forward ends of which are pivotally connected to the links 58 pivoted at 51. The arrangement is such that the comb and comb plate may move together or separately and the latter may be yieldingly supported by the former. The comb plate 48 is at the downwardly extending yarn ends rearwardly about the holding shot to a horizontal position and the comb 41 forces the ends upwardly between the warps about the holding shot, as shown in Fig. 10, whereupon the next inserted shots are beaten up as the nippers and comb are withdrawn, as will be apparent from Fig. 11.

It is desirable to provide means to help support and guide the nippers adjacent the weaving point, and this may be accomplished by providing the four parts of 20 formed at the upper end of the yieldingly supported lever 60 pivoted at 61 to the rocker lever 62 which is pivoted to the machine frame at 63. The lower end of the fork lever 69 is guided by the fork cam rod 64 and the lever 60 is normally held in the raised position in which it is shown in full lines in Fig. 2 by the spring 65 connected to the lower end of this lever and having its upper end anchored at 66. The notched portion of the fork 69 is adapted to receive a stud 71 upon the nippers and the fork lever 60 moves downwardly to the dotted line position of Fig. 2.

The nippers jaws are normally held closed by the springs 31 but are forced open to release the tuft yarns by the power actuated link 58 (Fig. 4) connected to one end of the bell crank lever 69 pivoted at 70 to the arm 34. The other end of the lever 69 is connected to the cone rod 32 to shift the same in the direction of its length, as will be apparent from Fig. 4.

The various parts of the loom are operated in timed relation, largely by the proper timing of the operating cams to weave the double tuft pile fabric having any desired pattern.

It will be apparent from the foregoing that the nippers 27, 32 operate to lay a double length of tuft forming yarns across the sheds so that when the ends of the set of yarns a are looped about the upper and lower holding shots and folded inwardly by the action of the nippers and comb, these ends will lie adjacent each other at the central plane of the double fabric where the pile is to be severed by the knife 13 to produce the separate pile fabrics F, F'.

What is claimed is:

1. A loom for weaving a double tuft pile fabric, the combination of shedding mechanism for forming an upper and a lower shed, tuft yarn presenters mounted for movement towards and from the weaving point, a rocking arm by which the tuft yarn presenters are supported, and a link connected to the rocking arm and actuated by a going part of the loom to impart to the arm and presenters an amplitude of movement sufficient to carry the tuft yarns bodily through and beyond both sheds, then rise through both sheds, and then turn the upper end of the tuft yarns about a holding weft shot in one shed, and comb mechanism for turning the other end of the tuft yarns about a holding weft shot in the other shed.

2. In a loom for weaving double tuft pile fabrics, the combination of shedding mechanism for dividing the warps into an upper and a lower shed, a rocking member mounted on the loom frame above the warp, tuft yarn presenters mounted on said member, a tuft yarn presenter opener shaft mounted on said member, means for moving said shaft longitudinally to open the presenters to engage tuft yarns from said sheds, means for actuating said tuft yarn presenters from said sheds, means for actuating said grippers to insert the severed lengths of yarn through said warps and thread the previously gripped ends of said yarns around one of said weft shots, a comb member to engage the other ends of said yarns and loop said ends around another of said weft shots, and means for actuating said comb.

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