May 8, 1934. H. J. WINTERS ET AL 1,958,388

TUFTED FABRIC LOOM

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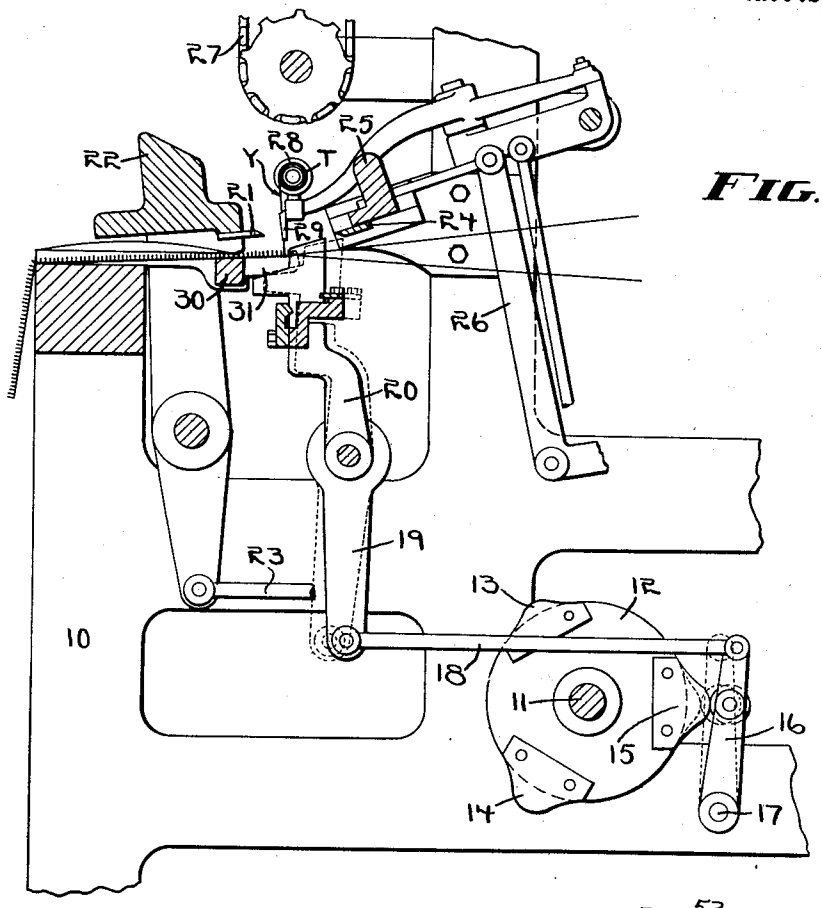


FIG. 1

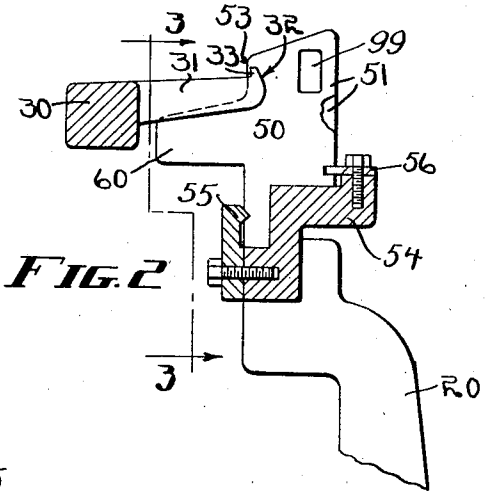
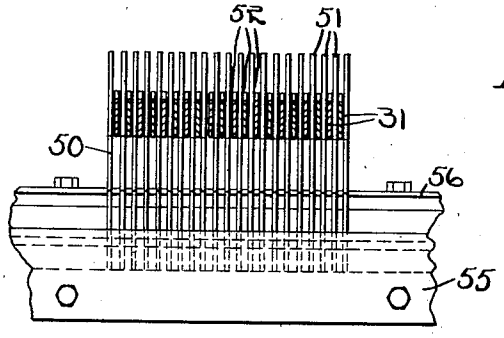


FIG. 2

FIG. 3



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FIG. 4

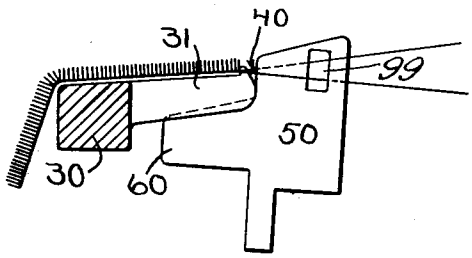


FIG. 5

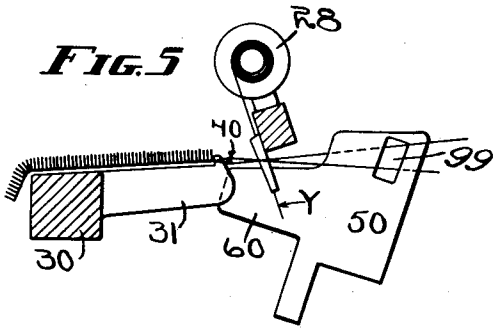


FIG. 6

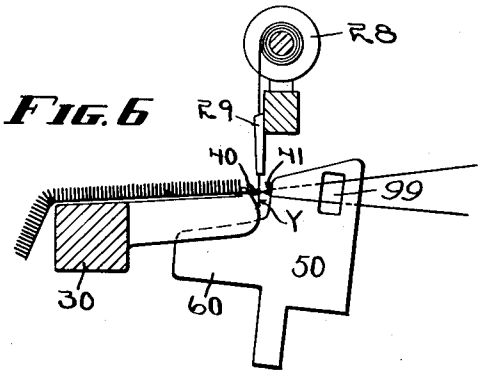
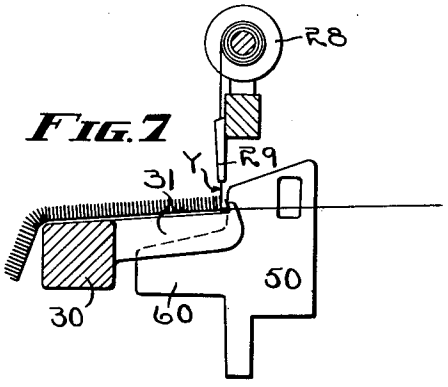


FIG. 7



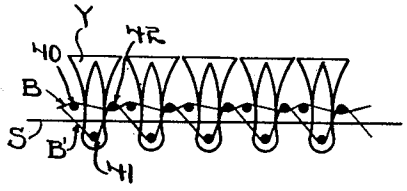


FIG. 8

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TUFTED FABRIC LOOM

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Application November 16, 1931, Serial No. 575,175

10 Claims. (Cl. 139—8)

This invention relates to looms for weaving tufted fabrics more particularly of the type wherein the pattern appears on the back and it is the general object of the invention to provide means for spacing properly the tuft yarns of an Axminster loom so that they do not become entangled when being forced up through the binder threads to form the tuft.

In the so-called Smith type of Axminster loom the tube frames project entirely through both the top and bottom sheds of binder warps and the color yarns extend downwardly from the tubes, and are therefore free to bend laterally. In a loom of this type the tuft yarn is usually bent under a pick of filling which lies in the upper part of the ground weave, and as a result the usual comb is assisted in its tuft forming operation by the binder threads which extend below the said upper pick. When it is desired to have the pattern appear through to the back, however, it is necessary to loop the tuft yarns under the pick of filling on the bottom of the ground weave, and there are therefore no binders or other yarns below this pick capable of supporting and bracing the tuft yarns against lateral displacement when being upturned to form the tuft. The resultant freedom of the projecting ends to become laterally displaced results in an imperfect back, and it is an important object of our present invention to provide means whereby the color yarns are confined to their proper positions. This result we may accomplish by forming the reed dents with integral forwardly projecting blades between which the tuft tubes project when placing the color yarn. The dents, together with the plates rigid or integral therewith, may be caused to swing around a center so disposed that as the lay moves forwardly the plates will maintain guiding relation with respect to the color yarns.

Provision must be made for the warp binders whch extend lengthwise of the fabric and this may be done by cutting notches between the teeth or hooks of a nose bar preferably employed in connection with our invention. The nose bar is provided with upwardly and forwardly inclined tuft engaging surfaces along which the color yarn slides when the pick of filling is beaten into the fabric by the reed. In order that these guide surfaces may be as wide as possible it is desirable to have the lateral space occupied by the color yarn positioners small. This we accomplish by placing the tuft guiding plates in the same plane with the reed dents. The positioning plates together with the binders lie between adjacent hooks, but take up so little room that the inclined surfaces can be wide, so that little or no opportunity exists for the color yarns to become caught in the notches.

The previously mentioned nose bar is provided with hook defining vertical notches parallel to the cloth and it is a further object of our invention to provide a series of guide plates integral with the reed dents and received at all times by the notches.

With these and other objects in view which will appear as the description proceeds, our 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 our invention is set forth,

Fig. 1 is a vertical section through a loom transverse of the lay having our invention applied thereto,

Fig. 2 is an enlarged view of a portion of Fig. 1,

Fig. 3 is a vertical section on line 3—3 of Fig. 2,

Figs. 4 to 7, inclusive, are diagrammatic views showing different positions of the reed and cloth board and associated parts, and

Fig. 8 is a diagrammatic view of the tuft.

Referring to Figs. 1, 2 and 3, we have shown a loom frame 10 having a cam shaft 11 to which is secured a spider 12. Three cam tappets 13, 14 and 15, respectively, are secured to the spider and are moved to have successive operating relation with a cam lever 16 moving about a fixed pivot 17. An operating rod 18 connected to the top of the lever is attached to the lower end of an arm 19 which rocks a lay structure 20.

A front knife blade 21 is secured to a rocking frame 22 moved through a link 23 operated in substantially the usual manner. A back knife blade 24 mounted on a rear frame 25 is controlled through the lever 26 and operates with the front cutter to sever the tufts after the pulling-off operation.

A transporting chain 27 acts to present the tube frames 28 one at a time to transfer position, each frame having the usual series of yarn tubes 29 through which project the color yarns Y. The latter are drawn from the spool T and these colors are arranged according to the demands of the pattern.

A cloth board 30 is secured to the loom frame and has rearwardly projecting spaced teeth 31 the rear surfaces 32 of which extend upwardly and forwardly and terminate in hooks 33.

Fig. 8 shows one form of fabric such as can be woven on our improved loom, this fabric comprising a ground weave of stuffers S, binders B,

and B', and shots of filling. As shown herein each row of tufts requires three shots of filling, the first shot 40 lying between the top shed of binders and the stuffer, and the second shot 41 lying under the stuffers but in the same binder shed as does shot 40. The third shot 42 lies in a second shed, and the tufted yarn Y extends entirely through the ground weave and under the bottom shot 41. The parts of the loom already described, except the cloth board teeth, may be constructed and operated substantially as is found in the ordinary Smith type of Axminster loom.

The lay is provided with a reed designated generally at 50 and comprising a series of separate blades 51. Adjacent blades are spaced apart as shown in Fig. 3 a distance corresponding to the space between adjacent yarn tubes. The cloth board teeth 31 are separated by notches 52 which receive the reed dents 51 and through which the binders may extend. The reed dents have forward beat-up faces or edges 53 which are used for the purpose of advancing the shots of filling, and said dents may be held as suggested in Fig. 2 by means of a transverse beam 54 acting together with front and upper clamps 55 and 56, respectively. We are not limited to any particular form of spacing or holding the reed dents in position and the structures shown in Fig. 2 for accomplishing this purpose are merely illustrative. Known means for accomplishing this result, such as found in so-called Crompton Moquette loom, may be used if desired.

Our invention relates more particularly to a set of spacers for the tube frames and color yarns which shall be so positioned as to prevent lateral displacement and entanglement of tuft yarns which project from the yarn tubes when the tube frame has been dipped through the fabric. To accomplish this result we provide each reed dent with a forwardly projecting spacer 60 which is preferably in alignment with the body of the reed dent from which it projects. As shown in Fig. 2 the spacer is received by the slots 52 of the cloth board so as to keep the reed dent and spacers always in register with the hooks.

In operation, we may lay the first pick of filling 40 in any approved manner, either beating the same to a position in front of the hooks, or leaving it behind the hooks, as suggested in Figs. 4 and 5. During the second pick of the loom the tube frame will be dipped so as to move the yarn tubes through the sheds to cause the color or tuft yarns Y to project as suggested in Fig. 5. At this time the reed is in rear position, but the spacers have their forward ends positioned by the notches 52 and are therefore held so as to receive the yarn tubes. During continued operation of the loom the tube frame is rocked so as to assume a vertical position and is raised to some such a position as shown in Fig. 6. The second shot of filling 41 is laid behind the color yarns Y, and is beaten up by the reed to the position shown in Fig. 7. During the beating-up of the second pick the color yarns move up the rear inclined surfaces of the spacers 32 and pass through a rearwardly projecting horizontal position while located between the reed dents. When the shot of filling which is behind the color yarn is moved to a position in front of the hook, said yarns are held tightly enough to permit the drawing-off of the color yarn for the next row of tufts. The cutters are then operated in known manner and the tube frame returned to the chain to make room for the next tube frame.

The purpose of the spacers 60 is to prevent the color yarns Y from being moved up between the wrong binder threads. It is to be understood that during the tuft forming operation, when the parts move from position shown in Fig. 6 to that shown in Fig. 7, the downwardly projecting tuft yarns are curled around the second pick 41 and are required to move first to a horizontal rear position and then are raised to a vertical position behind the second pick when the fabric snaps down in front of the hooks. From this it will be seen that the color yarn makes a half revolution around the second pick in a backward and then upward direction. It is during this movement of the color yarn that the spacers 60 guide said yarns to keep them properly aligned with respect to the binder threads which are positioned by the reed dents.

From the foregoing it will be seen that we have provided simple means for guiding the color yarns of an Axminster loom during the tuft forming operation, said means providing a preferably integral extension from the reed dent. This extension is received by the notches between the hooks and preserves this relation throughout the tuft forming operation, so that there is no opportunity for the color yarns to lose the alignment which they have with the binders when the yarn tubes are dipped through the shed. It is to be understood that the spacers 60 are so formed and move in such a path as to permit the operation of the ordinary needle not shown but common in Axminster looms for the purpose of laying the various shots of filling.

Having thus described our 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 we do not wish to be limited to the details herein disclosed, but what we claim is:

1. In an Axminster loom operating with warp threads to define a shed, a lay, reed dents on the lay spacing the warp threads and having portions to engage and beat the weft to the fell of the cloth, extensions projecting forwardly of the dents under the warp threads, and in front of said portions and a tube frame with yarn tubes to enter between the extensions, the latter preventing entanglement of adjacent color yarns carried by the tube frame.

2. In an Axminster loom having a tube frame with color yarns projecting from yarn tubes, a lay, a reed on the lay having dents to separate the binder warp threads and having portions to engage and beat the weft to the fell of the cloth, and extensions on the dents projecting forwardly with respect to said portions and spaced to receive and separate the color yarns of the tube frame.

3. In an Axminister loom having a tube frame with color yarns projecting from yarn tubes, which are dipped down through the binder warps during the tuft forming beat of the loom, a reed having dents to separate the binder warps and having portions to beat up a pick of filling, and extensions projecting forwardly from said portions spaced to receive and guide the color yarns when the tube frame is dipped.

4. In an Axminister loom having a tube frame with color yarns projecting from yarn tubes, a lay, a reed on the lay having dents to separate the binder warp threads and having portions to engage and beat the weft to the fell of the cloth,

and a spacer projecting forwardly from said portions and integral with each reed dent to separate the color yarns of the tube frame.

5. A reed dent for an Axminister loom having a weft engaging edge and an integral spacer for tuft yarns projecting forwardly from and below the weft engaging edge when the dent is in normal beat-up position and the dent also having a supporting part extended below the spacer.

6. In an Axminster loom, a tube frame having yarn tubes from which project color yarns, a reed through which the binder warps extend and having a part to engage the fell of the cloth, spacers formed as integral extensions projecting forwardly from and below said part of the reed, and means to dip the yarn tubes and color yarns through the binders and between the spacers to separate the color yarns and prevent entanglement thereof preparatory to tuft formation.

7. In an Axminster loom, a tube frame having yarn tubes from which project color yarns, a reed through which the binder warps extend and having a part to engage the fell of the cloth, the reed being formed of dents from each of which extends forwardly an integral spacer lying below and in front of said part of the reed, and means to dip the yarn tubes and color yarns between the spacers to separate the color yarns and prevent entanglement thereof during tuft forming operation.

8. In an Axminster loom, a tube frame having yarn tubes from which project color yarns, a reed through which the binder warps extend and having a part to engage the fell of the cloth, the reed being formed of dents each of which has a forwardly projecting integral extension aligned substantially with the dent and lying below and in front of said part of the reed, means to dip the tubes and color yarns through the binders and into the spaces between the extensions, and means operative during beating up of a shot of filling by the reed to cause the tuft yarns to move from positions between the extensions to positions between the reed dents, said extensions guiding the color yarns into the spaces between the dents during the tuft forming operation.

9. In an Axminster loom, a tube frame having yarn tubes from which project color yarns, a reed through which the binder warps extend and having a part to engage the fell of the cloth, the reed being formed of dents each having an integral forward extension lying below and in front of said part of the reed, said extensions and their dents defining parallel guide spaces, means to dip the yarn tubes and color yarns through the warps to a position between the extensions, the binders for each space lying to the sides of the latter and positioned by the dents and extensions, and means effective to move the color yarn from a position between the extensions rearwardly in said spaces to positions between the dents and thereafter move the color yarns upwardly between the binder threads in the tuft forming operation.

10. A reed dent for an Axminster loom having an aperture in the upper part thereof for the passage of warp threads and having a weft engaging edge on the front part thereof, and having also an integral spacer for tuft yarns projecting forwardly from and below the weft engaging edge when the latter is in vertical beat-up position.

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