Dec. 3, 1929. E. E. CLARK 1,737,642

TUFT PLACER FOR PILE FABRIC LOOMS

Filed Aug. 15, 1927 2 Sheets-Sheet 1

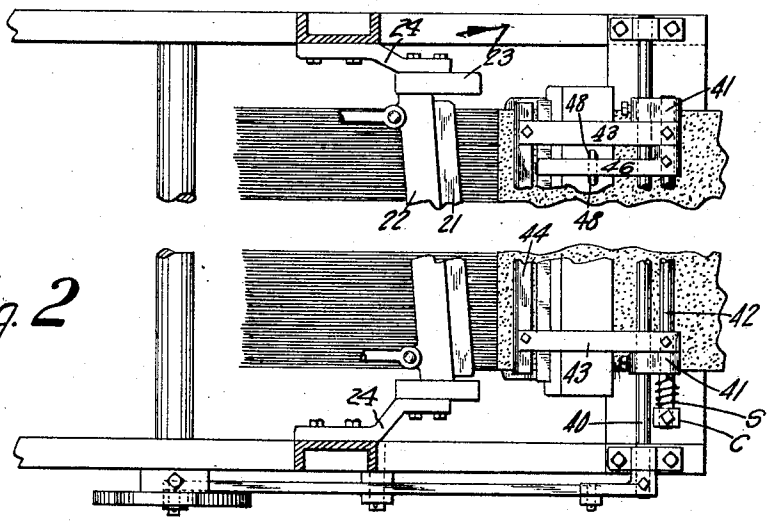


Fig. 2

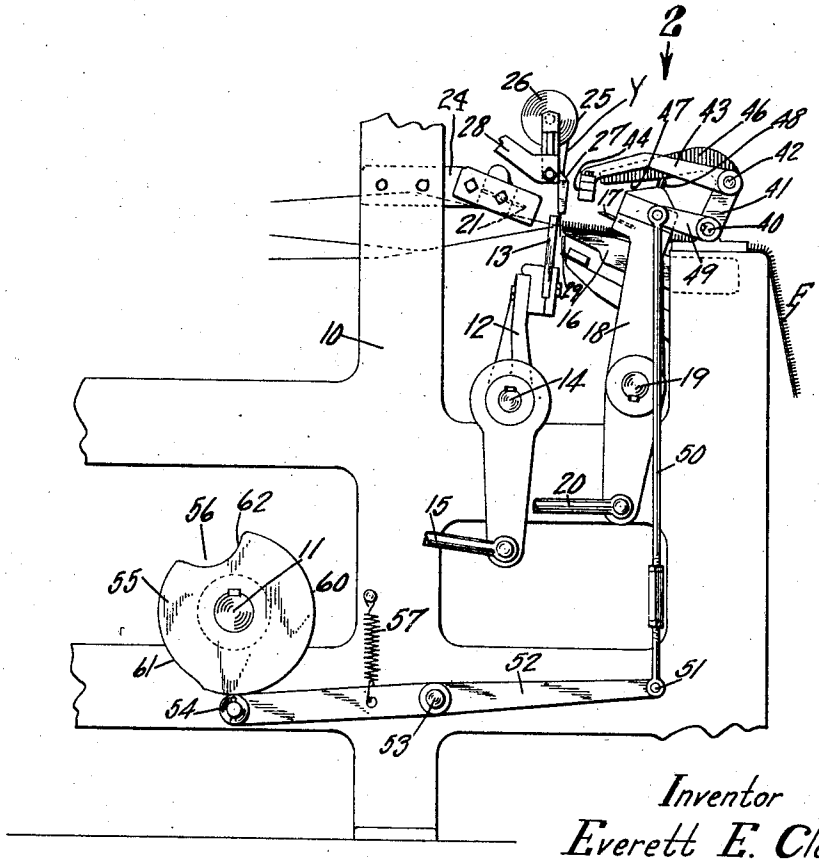


Fig. 1

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TUFT PLACER FOR PILE FABRIC LOOMS

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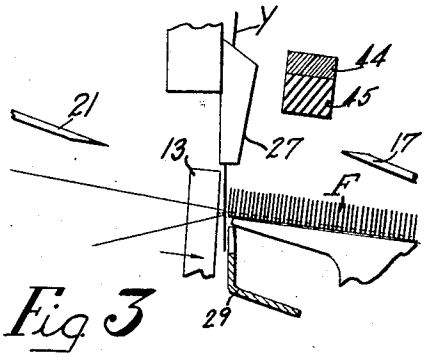


Fig 3

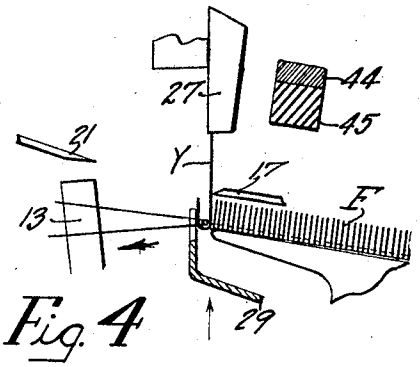


Fig. 4

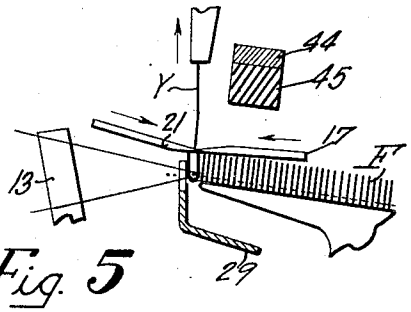


Fig. 5

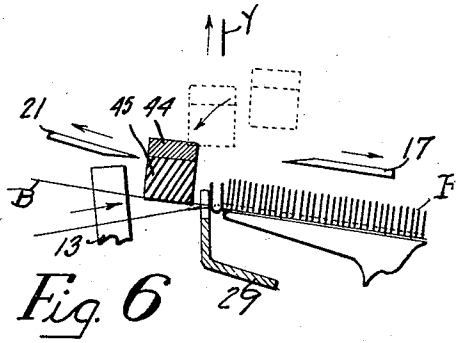


Fig. 6

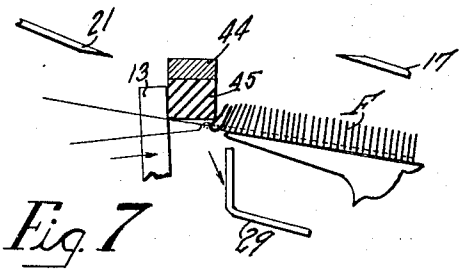


Fig. 7

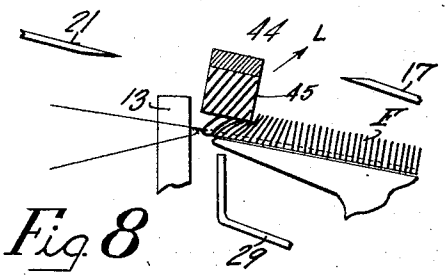


Fig. 8

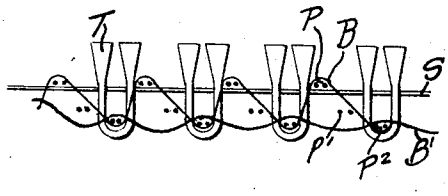


Fig 9

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Patented Dec. 3, 1929 1,737,642

UNITED STATES PATENT OFFICE

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TUFT PLACER FOR PILE-FABRIC LOOMS

Application filed August 15, 1927. Serial No. 212,948.

This invention relates to improvements in means for placing the tufts of pile fabrics and it is the general object of the invention to provide a simple means to engage a newly inserted row of tufts to draw the same upwardly through the warps so that they may be held tight while being incorporated into the fabric.

The invention is used in connection with an Axminster loom more particularly though not necessarily of the type such as is set forth in Patent No. 186,374 to Skinner and Smith. The ordinary Axminster fabric has the pile tufts extending only part way through the fabric, there being a pick of filling under the tufts to support the same and it is for this reason that the design on the face of the rug is not duplicated on the back. In so-called Karavan or Servian rugs the tufts extend entirely through the fabric and are visible from the back so that the pattern shows on both sides of the cloth. I have found that attempts to produce a fabric of this kind on the Skinner and Smith type of Axminster loom results in an undesirable looseness of the tufts due to the fact that said loom has no mechanism which will draw the tufts tightly in place. It is accordingly an important object of my present invention to provide a tuft positioning device provided with a surface of rubber or rubber like material which will be moved back of the freshly inserted row of tufts and then moved forwardly to drag said tufts upwardly and hold them tight while a pick of filling is being beaten in.

It is a further object of my present invention to make use of the front knife frame to assist in controlling the motion of the tuft placing bar or device. After the tube frame has been dipped through the warp threads and raised a sufficient amount to draw off the yarn for the next tuft to be laid by that particular frame a pair of knives, one behind and one in front of the tube frame, approach each other to sever the tufts from the tube frame. I make use of the forward motion of the front knife frame to permit a downward motion of the tuft placing bar while a cam on one of the shafts of the loom causes the rearward movement of the bar. The arrangement is such that when the bar is moving rearwardly it is held by the front knife frame sufficiently high not to engage the fresh row of tufts, but after the bar is behind the tufts the knife frame is far enough forward so that said bar may move fowardly along the warp threads and over and in engagement with the tufts to place the latter.

It is a still further object of the invention to employ the reed to give the tuft positioning bar its forward movement, the tuft engaging portion of the bar or device being in direct contact with the reed during the forward movement of said device, the latter being held against improper vertical movement preferably by frictional contact with the reed.

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 I have shown a convenient embodiment of my invention,

Fig. 1 is a side elevation of the loom having my invention applied thereto,

Fig. 2 is the top plan view taken in the direction of arrow 2, Fig. 1 certain parts being removed for the sake of clearness,

Figs. 3 to 8 inclusive show the successive steps in the operation of the device, and

Fig. 9 is a longitudinal section through a portion of the fabric to be made by my present invention.

My invention is carried out in connection with the ordinary Moquette or Axminster loom and in order that the nature and purpose of the invention may be understood I will first describe the fabric to be produced. As shown in Fig. 9 the binders B and B′ are so arranged as to hold upper double pick P and intermediate double pick P^1 in one shed and lower double pick P^2 in another shed. The stuffer S passes below the pick P and above the pick P^1. The distinctive feature of the fabric to be woven with the aid of my present invention is in connection with the tufts T and it will be seen by referring to

Fig. 9 that the tufts extend below and around the lowest picks P^2, that is, the tufts pass below both binders and the stuffer and under the lowest picks so as to be visible from the underside of the fabric. The tufts are held in position by friction of the binders as well as the pinching effect of the picks of filling. A fabric constructed as set forth herein will have the pattern visible from the back, a feature which is not found in the ordinary Axminster rug. I make no claim for the rug per se as the same is what has come to be known in the trade as the "Servian" rug.

The loom on which the fabric is woven may be as set forth in Figs. 1 and 2, where it will be seen that the frame 10 has rotatably mounted therein a bottom shaft 11. Lay 12 and reed 13 may be rocked back and forth on the pivot 14 through rod 15 by means of mechanism not shown herein. The loom frame may have a stationary cloth board 16 extending rearwardly from the front part of the loom and the tuft cutting mechanism may include a front knife 17 mounted on a frame 18 which is rocked about pivot 19 by rod 20 actuated at the proper time by mechanism not shown. The back knife 21 is supported by a bar 22 moving along guides 23 secured to brackets 24, said guides determining the direction of movement of said back knife. The loom operates with a series of tube frames one of which is shown at 25, said frames being presented one at a time and each having a spool 26 and a number of downwardly extending yarn tubes 27 one of which is shown in Fig. 1. The yarns Y extend from the spool 26 and are threaded through the tubes 27. A transferer arm 28 actuated by appropriate mechanism is provided for transporting a tube frame to and from weaving position.

A comb 28 normally under and in front of the fell of the cloth is arranged to be raised and moved rearwardly during the operation of the loom. The mechanism thus far described is usual and forms no part of my present invention.

I have found that the devices hereinbefore described will not bind the U-shaped yarn tufts tightly enough in place when said tufts extend through the back of the fabric. The tufts are loose and are not bound tightly enough into the fabric, and it is the object of the present invention to provide mechanism which will draw the tufts up and cause them to be held tightly in place until they can be beaten into the fabric.

Accordingly, in carrying out my invention I provide a rock shaft 40 which is shown in Figs. 1 and 2 as supported on the front part of the loom and I secure to said shaft a pair of arms 41 which support a rod 42. A pair of arms 43 are pivoted loosely on said rod and extend rearwardly to support a positioning bar 44. The underside of said bar may have secured thereto a strip 45 of soft material having a high coefficient of friction, such as rubber. Secured to said rod 42 is a cam arm 46 the under cam surface 47 of which engages a boss 48 carried by the front knife frame 18. Torsion spring S between collar C on rod 42 and one arm 41 aids gravity in lowering the positioning bar 44.

Regular rocking motion is communicated to shaft 40 by means of an arm 49 connected thereto and having connection with the upper end of an actuating rod 50 of adjustable length. The lower end of said rod is connected as at 51 to a cam lever 52 pivoted as at 53 to the frame of the loom. Said lever 52 may carry a cam roll 54 to engage a cam 55 secured to the bottom shaft 11 and having a depression 56 for a purpose to be described hereinafter. A light tension spring 57 is interposed between the cam lever and a fixed part of the loom and tends to hold the roll 54 against the cam 55.

The operation of the device is shown in Figs. 3 to 8. As shown in Fig. 3 the tube frame is in low position with the tuft yarn extending through and below the binder and stuffer warps; the knives are separated; the reed is beating in a pick of filling; the comb is in low, forward position; and the bar 44 is in raised, forward position. While the reed is forward and pinching the tuft yarn cloth board the tube frame will move up to draw off enough yarn to form the next tuft to be supplied by that particular tube frame.

The lay will then move back, the comb will move rearwardly and rise between the warp threads to curve the tuft yarn backwardly and upwardly at the same time that the front knife is moving rearwardly to cutting position. The tube frame, which was previously raised is still up; the bar 44 is practically unchanged; and the back knife is beginning its forward movement. The parts are now in the position shown in Fig. 4.

In the continued operation of the loom the back knife will move forwardly to the position shown in Fig. 5 to cut the tuft from the tube frame. The lay is still back and a second pick of filling is laid behind the comb. The bar 44 will still be raised but the knives will start to move apart.

As the knives separate as indicated in Fig. 6 the bar 44 will move downwardly and rearwardly, resting finally on the upper warps behind the newly inserted row of tufts. The tube frame will rise to be attached to the transporting chain of the loom and the lay will start forward to beat the second pick of filling into the cloth.

As the lay advances it will engage the bar 44 and rubber 45, preferably the latter only, as shown in Fig. 7, and cause the front lower edge of the strip of rubber to engage the lower part of the rear strand of the tufts. The ef-

fect of this is to lift the tufts somewhat. The comb will move downwardly at this time to be out of the way of the tuft engaging member.

The final operation of the rubber strip 45 on the tufts is shown in Fig. 8, the bar 44 rising and moving forwardly over the tufts to drag the last row tightly into the cloth. The lay will continue forwardly to beat the second pick in behind the new tufts to hold them in place. The parts will remain substantially as indicated in Fig. 8 with the exception of the lay, while a third pick of filling is laid corresponding to the pick P in Fig. 9.

The rearward movement of the bar 44 is controlled by cam 55, the vertical movement thereof is controlled principally by the front knife frame, and the forward movement is controlled partly by the lay and partly by the cam 55. It will be seen in Fig. 6 that the front knife is moving frontwardly while the cam is acting to move the bar 44 rearwardly so that boss 48 cooperating with cam surface 47 on arm 46 permits the bar to descend. The front knife will still be forward sufficiently when the lay advances as shown in Fig. 7 to be out of controlling position with respect to the bar 44. The latter may therefore be dragged over the tufts and not return along the path indicated by dotted lines in Fig. 6.

From the foregoing it will be seen that I have provided a simple mechanism whereby each row of tufts as it is formed may be drawn tightly in place, this result being accomplished by a tuft engaging and positioning bar which moves behind the row of tufts immediately after the latter have been cut from the tube frame and then moves forwardly in sliding contact with the tufts. It will further be seen that the front knife frame of the ordinary Axminster loom is employed to control certain of the movements of the tuft positioning bar and it will also be noted that the resilient lower portion of the tuft engaging bar is in direct contact with the reed of the loom to prevent improper vertical displacement of said bar during its tuft positioning movement.

Having thus described my invention it will be apparent 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 tufted fabrics, a reed, means to introduce a row of tufts between the warp threads, and additional means independent of the reed but movable by engagement with the reed to engage said tufts and draw the same upwardly prior to the incorporation thereof into the fabric.

2. In a loom for weaving tufted fabrics, a reed, means to insert a pick of filling, means to introduce a row of pile forming tuft yarns which extend under the pick of filling, and means separate from the reed but movable by the latter to engage said row of tufts frictionally to move the same upwardly with respect to the pick of filling.

3. In a loom for weaving tufted fabrics, a reed, means to lay a pick of filling, means to introduce a row of pile forming tuft yarns which extend below and around the pick of filling, and means deriving motion from the advancing reed to move behind the row of tufts and then forward and in engagement with said tufts to drag the same upwardly against the pick of filling.

4. In a loom for weaving tufted fabrics, a reed, means to introduce a row of tuft pile forming yarns between the warp threads, and a tuft positioning member to be engaged by the reed and moved forwardly into frictional engagement with the tufts to raise the same and hold said tufts tightly while the reed is beating them into the fabric being woven.

5. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, a reed, means to pass a row of pile forming tuft yarns under and around the said pick so that said tufts extend entirely through the fabric being woven, and means moved forwardly by the reed to exert an upward pull on said row of tufts to draw them against the pick of filling.

6. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, a reed, a tuft positioning member having a friction surface to engage the tufts, and means engaged by the reed to move said positioning member against and over the tufts to exert a lifting force thereon as the reed moves toward the row of tufts.

7. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, a reed through which the warp threads extend, means to introduce a row of pile forming tuft yarns through the fabric between the warp threads and under and around said pick of filling, and tuft positioning means to rest on the upper binder warp threads to be engaged by the reed as the latter moves toward the tufts, said reed moving the tuft forming member against and over the row of tufts and said member exerting a lifting force on the tufts to pull the same tightly against the pick of filling.

8. In a tuft fabric loom, a tube frame, knives to cut the yarn from the tube frame, and tuft positioning means independent of the lay, knives and tube frame movable by a force derived from the lay to engage the row of tufts and cause an upward movement of said tufts as the lay moves forwardly to draw said tufts tightly against a pick of filling.

9. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to introduce a row of pile

forming tuft yarns to extend under and around the pick of filling, a tuft positioning member having an inherently resilient portion to engage said tufts, and means to move said member to cause said resilient portion to exert a lifting force on the tuft yarns as the reed moves toward the row of tufts.

10. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to introduce a row of pile forming tuft yarns under and around the pick of filling, a tuft positioning member having a body of rubber thereon, and means to move said member so that the body of rubber will frictionally engage the row of tufts and move over said row of tufts to exert a lifting force on the tufts to draw the same against the pick of filling.

11. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to introduce a row of tufts under and around the pick of filling, a comb to move behind said tufts and assist in forming the same, and a tuft positioning member to move first against the comb while the latter is in engagement with the tufts and then over the tufts to exert a lifting force thereon to draw said tufts tightly against the pick of filling.

12. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to place a row of pile forming tuft yarns under and behind the pick of filling, a knife carrying frame movable toward and from the row of tufts, a tuft positioning member controlled as to vertical position by the knife frame, said frame moving forwardly as said positioning member moves downwardly, and means to move said positioning member forwardly toward the knife frame and in vertical contact with the tufts to exert a lifting force on the tufts.

13. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to place a row of pile forming tuft yarns under and behind the pick of filling, a knife carrying frame movable forward from the row of tufts after the latter have been placed under the pick of filling, a tuft positioning bar controlled as to vertical position by the knife frame, and additional means to move said bar behind the row of tufts, said bar moving rearwardly and downwardly as the knife bar moves forwardly, and said bar moving against and frictionally exerting a lifting force on the tufts to draw the same tightly against the pick of filling while the knife frame is in forward position.

14. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to place a row of pile forming tuft yarns under and behind the pick of filling, a constantly rotating cam, a knife bar movable forwardly from the row of tufts after the latter have been passed under the pick of filling, and a tuft positioning bar controlled jointly by the cam and the knife frame and movable to a position behind the row of tufts and then forwardly into frictional contact therewith to draw the tufts upwardly against the pick of filling.

15. In a loom for weaving a tufted fabric having a pick of filling on the underside thereof, means to place a row of pile forming tuft yarns under and behind the pick of filling, a reed movable toward the row of tufts, and a body of rubber to be moved behind the row of tufts and in front of the reed and to be directly engaged by said reed and moved thereby forwardly and upwardly while in contact with the tufts to exert a lifting force on said tufts to draw the same tightly against the pick of filling.

16. In a loom for weaving tufted fabrics and operating with binder warp threads, a reed, a tube frame to supply a row of tuft yarns, a pair of knives to cut the pile forming tuft yarns from the tube frame, a comb to engage the lower portion of the tuft yarns and bend the same upwardly between the binder threads, a cam, and a tuft positioning member jointly controlled by the cam and one of the knives, said positioning member being moved rearwardly and downwardly by the cam and cutter, respectively, to rest on certain of the binder warps and said reed engaging the member and moving the same first against the comb while the latter is holding the tufts in position and then against said tufts and causing said member to move upwardly over said tufts to exert an upward force to lift said tufts and draw the same tightly in position.

17. In a loom for weaving tufted fabrics, means moving with the lay, means to introduce a row of tufts between the warp threads in front of the first named means, and additional means including a cam to move the row of tufts forwardly in advance of the first named means, said additional means moving rearwardly independently of the first named means and forwardly in contact therewith.

18. In a loom for weaving tufted fabrics, means moving with the lay, means to introduce a row of tufts between the warp threads in front of the first named means, a member in front of the lay, a cam to move said member rearwardly to a position where it may engage a row of tufts, said member providing forward motion by direct contact with the first named means, the cam being so designed as to permit without interruption a forward movement of the member under influence of the reed.

19. In a loom for weaving tufted fabrics, means moving with the lay, means to introduce a row of tufts between the warp threads in front of the first named means, a member normally in front of the row of tufts, a cam

operatively connected to the member to move the latter to a position behind the row of tufts, said cam being formed to temporarily lose control of the member during the forward movement of the means carried by the lay, the latter imparting forward motion to the member to move the latter into contact with the row of tufts.

In testimony whereof I have hereunto affixed my signature.

EVERETT E. CLARK.